THIRD SERIES VOL 59 NUMBER 6 APRIL 1952

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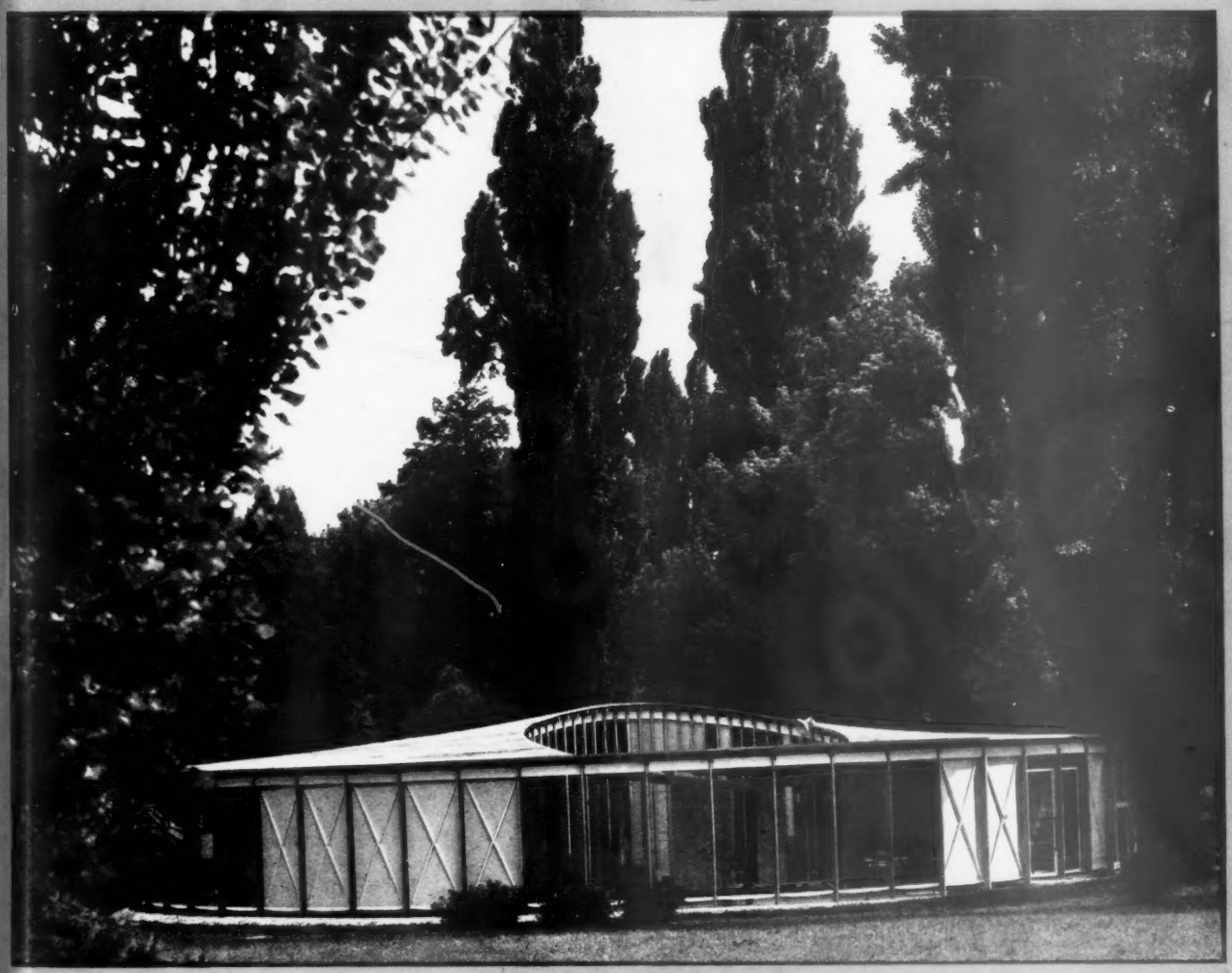

Pavilion for the U.S.A. at the IX Triennale Exhibition, Milan, 1951. Architects B.B.P.R. (Belgioioso, Peressutti and Rogers).

British Patent Application No. 20267/50

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THE JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

THIRD SERIES VOL 59 NUMBER 6 : : APRIL 1952 : : TWO SHILLINGS & SIXPENCE

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Visit of the President to Canada and the U.S.A.

The President, Mr. A. Graham Henderson, Mrs. Henderson and the Secretary, Mr. C. D. Spragg, are visiting Canada and the United States, until the middle of May. The Royal Architectural Institute of Canada are holding their Annual Assembly at Vancouver from 30 April to 3 May and a very warm invitation to the President and Secretary was received from Mr. Roxburgh Smith, the President of the R.A.I.C., to be present on this occasion, and also to visit some of the headquarters of the Canadian federated architectural societies. When it was found that the President could find time for a visit of this kind the Council unanimously agreed to accept the invitation on behalf of the President and Secretary.

It was also decided to take advantage of the visit of the President to the American continent to present a pair of candelabra to the American Institute of Architects as part of the furnishing for their historic building, the Octagon, which is now being converted into a museum. A cordial invitation has been received from the American Institute of Architects not only to visit Washington but also Portland, Oregon, the town in which Mr. Glenn Stanton, the President of the American Institute, practises, and also to stop at Chicago, San Francisco and New York.

The President and Mrs. Henderson sailed in the *Empress of Canada*, arriving at Quebec on 15 April. The Secretary flew direct to Montreal where he joined them. The itinerary is as follows : Quebec, Montreal, Ottawa, Toronto, Chicago, Winnipeg, Calgary, Sicamous, Vancouver, Victoria, Portland (Oregon), San Francisco, Washington, New York.

The Standard Method of Measurement

The Standing Joint Committee for the Standard Method of Measurement of Building Works receive from time to time requests for reconsideration or clarification of specific items in the Standard Method of Measurement: in addition they have before them the recommendation of the Anglo-American Productivity Team's Report, which reads 'Consideration should be given to the simplification of the Standard Method of Measurement'.

To enable the Committee to give the fullest possible consideration to these matters and to the principles involved, detailed suggestions would be welcomed from those interested. These should be sent by 31 May next to The Registrar, S.M.M.C., The Royal Institution of Chartered Surveyors, 12 Great George Street, Westminster, S.W.1.

The Annual Reception

Members are reminded that the Royal Institute's 1952 Reception is to be held on 23 May. The programme has now been completed. The President and Mrs. Henderson will receive members and guests from 8.15 p.m. to 9 p.m., and there will be dancing from 9 p.m. to midnight, music being provided by George Jay's orchestra. An exhibition in the Library with the title 'Opportunities Lost' will be on view and there will be puppet shows in the Henry Jarvis Meeting Room. The Annual Reception is the occasion when the Royal Institute entertains Ministers of the Crown, members of the Diplomatic Corps, its Honorary Fellows and Associates and the Presidents and Secretaries of other learned societies. The gathering is always a distinguished one, and reflects the esteem in which the Royal Institute is held in public life.

Application for tickets should be made as soon as possible to the Secretary, R.I.B.A. The cost is 15*s.* each member and guest.

A.B.S. Progress

The 1951 Appeal by the Architects' Benevolent Society raised £632 17*s.* 8*d.* for the General Funds and £1,462 19*s.* 5*d.* for the Centenary Appeal Fund; the latter figure includes £784 15*s.* 10*d.* as the proceeds of the Ball at the Dorchester Hotel last December. The Centenary Appeal Fund total is now £9,262 16*s.* 3*d.*

The President and Council of the A.B.S. wish to thank all contributors for their generosity which resulted in these additions to the funds during the past year and hope that their support will be continued. The 1951 Appeal, made by the President just before Christmas, is still open to those who have hitherto forgotten to send their donations.

The Centenary Appeal Fund has still a long way to go before the aim of raising the sum of £50,000 for the building of homes for elderly people is achieved. Meanwhile the Sites and Building Committee have inspected some sites near London but have not yet found one which meets their approval. Members are asked to bear this matter in mind and bring to the notice of the Society any sites they think are suitable. The desirable qualities of a site were stated in an editorial note in the February JOURNAL.

Architecture Bronze Medal

The R.I.B.A. Architecture Bronze Medal for the area of the Essex, Cambridge and Hertfordshire Society of Architects has been awarded to Mr. C. H. Aslin, C.B.E. [*F*] in respect of the Templewood School, Welwyn Garden City.

The R.I.B.A. Dinner

If numbers are a guide, the second post-war dinner held at Grosvenor House on 20 March was a great success in that no less than 557 members and guests attended. This would have been far beyond the capacity of the Henry Florence Hall, so that the Council's decision not to hold the dinner in the R.I.B.A. building proved to be wise. Unfortunately, Mr. Attlee [*Hon. F*], the chief guest, had to decline at the last moment, but there was a distinguished gathering at the top table. The government was represented by the Rt. Hon. James Stuart, Secretary of State for Scotland, the Rt. Hon. David Eccles, Minister of Works, the Rt. Hon. Florence Horsbrugh, Minister of Education, and Mr. Hugh Molson, M.P., Parliamentary Secretary, the Ministry of Works. The Deputy High Commissioner for the Union of South Africa, Mr. C. H. Torrance, and the Commercial Adviser to the High Commissioner for India, Mr. Dharma Vira, were seated near the President, together with the Duke of Wellington [*Ret. F*], Lord Macmillan [*Hon. F*], Sir Gerald Kelly, R.A. [*Hon. F*], President of the Royal Academy, the Lord Bilsland [*Hon. A*] and Sir Hector Hetherington [*Hon. A*], Vice-Chancellor of the University of Glasgow. The Civil Service was represented by Sir Thomas Sheepshanks, Secretary to the Ministry of Housing and Local Government, and Sir Harold Emmerson, Secretary to the Ministry of Works. There were also the Presidents of the Law Society, Royal Institution of Chartered Surveyors, Institution of Electrical Engineers, Institution of Mechanical Engineers, Institution of Structural Engineers, Architectural Association (Mr. Anthony Chitty [*F*]), the National Federation of Building Trades Employers, the National Federation of Building Trades Operatives and the London Master Builders' Association. Past Presidents of the R.I.B.A. were Sir Banister Fletcher, Mr. H. S. Goodhart-Rendel and Sir Lancelot Keay. Also at the top table were the Chairman of the London County Council, Mr. A. C. Bossom, M.P. [*F*], the Director of the National Federation of Building Trades Employers, the Chairman and Registrar of the Architects' Registration Council, the Secretary of the C.P.R.E., Mr. R. E. Enthoven, Vice-President, R.I.B.A., and Mr. Martin S. Briggs, Hon. Secretary, R.I.B.A.

Reports of the speeches will be found on pages 205-208 of this JOURNAL.

Building in Stone

We understand that several Oxford colleges have received licences to undertake extensive repairs to stone-faced buildings which have decayed under the combined action of time, weather and a city atmosphere. This is a welcome recognition by the Ministry of Works of the need to maintain the stonemason's craft, if only for the repair of ancient buildings. Some time ago the Royal Institute urged the Government departments concerned to take action in this matter and especially to do what was possible to encourage apprentices to enter the trade. The late Arthur Moberly was especially active in this matter and contributed two articles on it to the JOURNAL. He represented the R.I.B.A. on the Building Apprenticeship and Training Council and on the Consultative Committee for the Stone Industry and recently he was able to report that the rapid decline in the trade, resulting from war-time and post-war conditions, had been stopped and that there was a steady growth in the number of apprentices. The Council have now appointed Mr. Romilly B. Craze [*F*] to these two bodies in the place of Mr. Moberly.

The grant which is made to permit the erection of stone houses in suitable villages is already doing much to keep the craft alive in rural areas, though this is mainly small scale hand work. It is to be hoped that the supply of licences will be sufficient to maintain what might be termed the urban section of the mason's craft, in which machines for sawing and moulding are used and the more highly skilled craftsmen employed in finishing and fixing.

Lecture on Modern Italian Architecture

Mr. G. E. Kidder Smith is to lecture at the R.I.B.A. on *Contemporary Italian Architecture and the Italian Heritage* on Monday 28 April at 6 p.m. Mr. Kidder Smith is well known for his books *Sweden Builds* and *Switzerland Builds*, and for his photographs in Philip Goodwin's book *Brazil Builds*. Recently he has extended his studies to Italy with the intention of writing a book on its modern architecture and has taken a large number of photographs, some of which are in colour. We understand that he will use some of these to illustrate his lecture. Mr. Kidder Smith is coming specially from America to give this lecture.

Hon. Corresponding Member

Senor Hugo Lopez Videla, Planning Adviser to the Ministries of Defence and Public Health, Bolivia, has accepted the invitation of the Council to become an Honorary Corresponding Member.

Our Sports Column

It happens that the honorary secretaries of both the R.I.B.A. Golfing Society and the R.I.B.A. Cricket Club have asked us to say that their societies would like to have larger memberships. It seems that the members of both enjoy themselves so much at their occasional games and matches that they would like other architects to do the same. The honorary secretaries also say that in neither game do their clubs set abnormally high standards of play, so that no one who is thinking of joining need fear that he would be outclassed. The aims of the societies are friendly games and not intense matches.

The R.I.B.A. Cricket Club have six fixtures this summer, all of them whole day matches, between 21 May and 17 July. They are against the London Master Builders' Association, the Vitruvians, the Blue Circle Cricket Club, the A.A., the R.I.C.S. and the Club Cricket Conference.

The R.I.B.A. Golfing Society, in addition to their fixture list, hold a summer week-end meeting at Deal, which last year was a great success. They suggest that architects who live away from London and the South East of England might like to join this event. Also the Hon. Secretary would be glad to hear from any provincial architects who could raise a team to play a match against the London members.

The Hon. Secretary of the R.I.B.A. Cricket Club is Mr. Basil Smyth, 'Staunton', The Drive, Chorley Wood, Herts; the annual subscription is 5*s*. The Hon. Secretary of the R.I.B.A. Golfing Society is Mr. E. H. Firmin, 10 Manchester Square, W.1, and the annual subscription is 10*s*. (See also p. 228 of this JOURNAL.)

Fellowship at Harvard

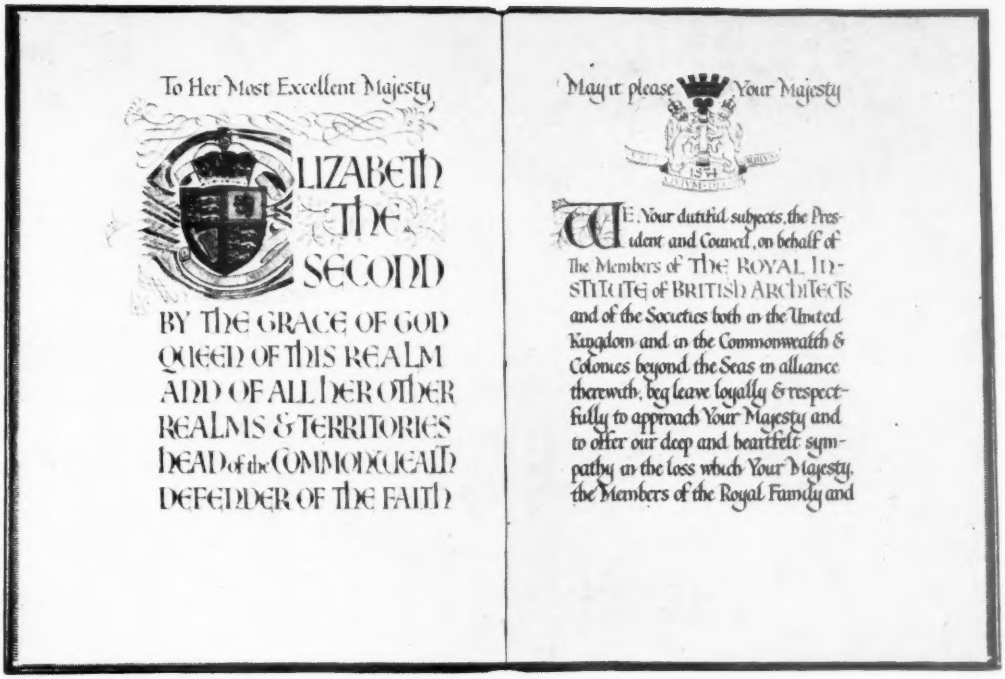
Mr. Roger Radford [*A*] has been elected to a Henry Fellowship tenable at Harvard University for the academic year 1952-53. Mr. Radford proposes to spend the year in studying the architecture of the U.S.

The British Architects' Conference, Edinburgh

The itinerary of Half-Day Tour No. 2, as shown in the Conference programme issued with the March JOURNAL, has had to be altered. The tour will now be Headquarters—Aberlady—Gullane—Dirleton—Tantallon Castle—returning via North Berwick (tea)—Haddington—Headquarters at 5 p.m.

R.I.B.A. Diary

MONDAY 28 APRIL. 6 P.M. Lecture, *Contemporary Italian Architecture and the Italian Heritage*. Mr. G. E. Kidder Smith.
WEDNESDAY 30 APRIL. 7 p.m. Exhibition of Contemporary Italian Architecture closes.
TUESDAY 6 MAY. 6 P.M. Annual General Meeting.
MONDAY 12 MAY. 6 P.M. Library Group Meeting—identification of some drawings in the R.I.B.A. Library.
FRIDAY 23 MAY. 8.15 P.M. R.I.B.A. Reception.


To Her Most Excellent Majesty

ELIZABETH THE SECOND

BY THE GRACE OF GOD QUEEN OF THIS REALM AND OF ALL HER OTHER REALMS & TERRITORIES HEAD of the COMMONWEALTH DEFENDER OF THE FAITH

May it please Your Majesty

WE, Your dutiful subjects, the President and Council, on behalf of the Members of THE ROYAL INSTITUTE of BRITISH ARCHITECTS and of the Societies both in the United Kingdom and in the Commonwealth & Colonies beyond the Seas in alliance therewith, beg leave loyally & respectfully to approach Your Majesty and to offer our deep and heartfelt sympathy in the loss which Your Majesty, the Members of the Royal Family and the Nation have sustained by the Death of Your Royal Father, our late Most Gracious Sovereign King George VI. In His revered Majesty encouraged with his Royal and generous Patronage the Art that is so dear to us, and we mourn with deepest sorrow, not only our beloved Ruler, but also the gracious and beneficent Patron of the Royal Institute. WE most respectfully and dutifully tender to Your Majesty our sincere devotion and loyalty on your accession to the Throne, and earnestly pray that the Almighty will grant Your Majesty a long, happy and glorious Reign during which the Nation may prosper, the Arts flourish and Your Peoples enjoy all the blessings of Peace.

President

Vice President

Vice President

Vice President

Hon Secretary

Hon Treasurer

Secretary

Photographs of the four pages of the Loyal Address to Her Majesty Queen Elizabeth II. The address is in the form of a book bound in blue goatskin leather with gilt tooling and lettering. The title is 'The Loyal and Respectful Address of the Royal Institute of British Architects to Her Most Gracious Majesty Queen Elizabeth II'. The pages are vellum, the lettering on the first page being blue and the initial 'E' in gold and heraldic colours. The seal, in red wax on a blue ribbon, hangs below the book and has been placed on the page for the purpose of the photograph. The address was engrossed by Miss Rosemary Ratcliffe

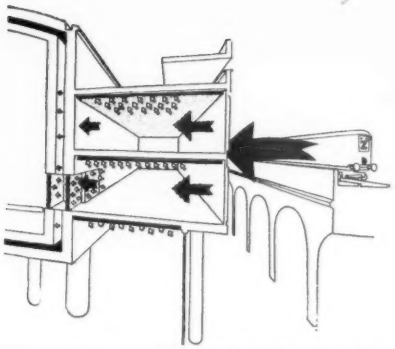


Fig. 1: Diagram showing the defences against train noise; the outer wall, absorbent foyers, the double walls and double doors of the auditorium

Science and the Design of the Royal Festival Hall

By Dr. Leslie Martin, M.A., Ph.D.(Manchester), [*F*]

Read before the R.I.B.A. on 18 March 1952

Mr. Martin S. Briggs, Hon. Secretary, R.I.B.A., in the Chair

I MUST MAKE my position clear at the outset. I have been asked to speak about the influence of science on the design of the Royal Festival Hall. I certainly cannot speak as a scientist, nor can I claim any special scientific knowledge.

My attitude to the relationship between science and art has been stated elsewhere.[1] It is simply this: that science can produce the facts but that art must show us the way in which they can be used. I do not want to be misunderstood at this point. I am well aware that many scientists (not the least Darwin himself), in their formal vision and in the presentation of their work, have seen and worked in some degree as artists. But in doing this they have stepped outside the bounds of science. It is the scientist's province to provide facts—facts which can be clearly verified and demonstrated. Thanks to science we may know the facts of sound insulation, of daylighting, of strength of structure; we may know all these with some degree of certainty. I do not wish to detract in any way from the value of these contributions. On the contrary, they immensely increase the comfort and convenience of human beings, and from this point of view alone they must be welcomed by architects. But the sum total of all these facts can never tell us how they should be used, for that is not a question of fact at all but one of feeling. In short, it is the province of art.

For this reason it is clear that I do not believe that 'functionalism' is an adequate theory, or that science can and will take over and replace the province of art. On the other hand, I am equally certain that the influence of science, and the new facts which it presents, can change art out of recognition.

The designer of a concert hall may start out, and probably will, with a formal conception. But that formal idea will be fundamentally influenced by the extent to which scientific knowledge is used in establishing the basic factors.

Now what are the basic elements of a concert hall that immediately give rise to broad general conceptions of form? First, and dominating everything else, there is the auditorium itself. Here, as in the theatre, the great seating area gives rise to well-known type forms.[2] The roofing of this wide spanned area is a major structural problem, and in recent buildings the contributions of science have frequently shown themselves in the form of an engineering *tour de force*, using thin skins of shell or egg-like construction. There is, for example, Le Corbusier's auditorium in his scheme for the palace of the Soviet in which the shell-like form is clearly demonstrated—or for instance the total theatre project by Walter Gropius. Others have exploited parabolic or dome-like forms. But all these solutions have one thing in common: they reduce weight to a minimum: they exploit lightness of structure.

It is through the direct influence of science that the design of the Royal Festival Hall makes a radical departure from these conceptions. Its site is alongside a noisy railway bridge, and the central problem is one of insulation against external noise. Noise is resisted by weight and mass. The enclosure of the auditorium is therefore no longer a question of thin skins or lightly suspended roof construction. It is a question of building a heavy barrier against sound penetration. As this influence from science has such a profound effect on the final design it is important to describe the scientific approach in some detail.

External Noise. Before any methods of sound insulation can be devised for a building, it is first of all necessary to know the sound intensities on the site itself.

The site was first visited by the B.R.S. mobile laboratory in September 1948, and the work was conducted by Mr. Parkin. Mr. Parkin's various papers on this subject have described how he analysed the noise over the whole frequency range.[3] A general measurement of the total sound intensity is in itself of little use, as the insulating value of a wall varies with the different frequencies. Thus, a 9-in. wall has an insulating value of 38 db. at 100 c/s, 43 db. at 200 c/s, 48 db. at 400 c/s, and so on. By using an electric filter between the measuring microphone and the noise level indicator, Mr. Parkin sorted out the noise into frequency bands. He then repeated these measurements at several positions on the site.

In this way the noise emanating from the various railway tracks on Hungerford Bridge was accurately gauged. For the purpose of deciding the necessary insulation, only the maximum sound level need be considered. This was shown to be greatest in the lower frequency range: for example, in the 75/150 c/s band it was 84 db., in the 600/1,200 c/s band it was 75 db. The various positions on the site at which readings were made showed quite clearly the influence of distance from the source of sound on the actual cost. (Fig. 3.) For example, the difference between the sound pressure at two points of measurement, A and B, amounts to as much as 10 db. A wall designed for position B (which is nearer to the source of sound) would have to be increased to four times the thickness required to resist the sound pressure at position A.

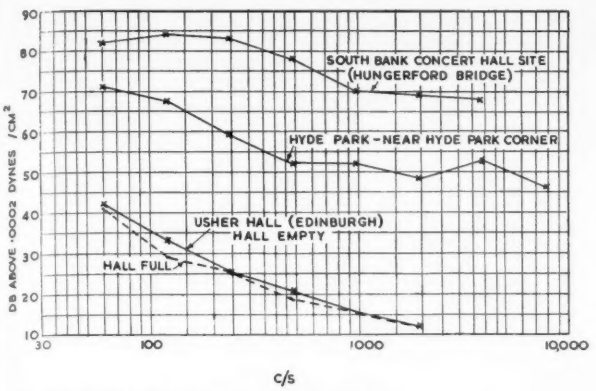
But it is not necessary for wall thickness to reduce these external noise levels below the threshold of hearing. The interior of a full concert hall, even during the quietest passages, has its own noise level. (Fig. 2.) Mr. Parkin had established this by means of measurements taken in the Usher Hall at Edinburgh during short pauses in Vaughan Williams' E Minor Symphony. A simple subtraction of permissible sound levels inside the auditorium from the maximum sound levels outside gives the insulation value for the structure. This value can then be plotted against the insulation values of brick walling. But a cavity can increase the insulation value, particularly as the frequency increases, without any increase of actual mass. A cavity is therefore an economical measure, and Mr. Parkin finally recommended (in terms of concrete) a 12-in. outer skin, 12 in. of cavity and a 10-in. inner skin for the auditorium wall itself.[4] The roof, which received the sound waves at grazing incidence only, could be reduced to two skins (6 in. and 4 in.) with a 2 ft. air space between. Woodwool inside the wall cavity and used as a lining to the inner leaf of the wall, and glass silk quilt in the cavity of the roof, gave some sound absorption in the cavity itself and some increase in insulation. A vital factor in the construction was the complete isolation and separation of the outer and inner skins.

[1] Architects' Year Book, Vol. II.

[2] Science makes a contribution here: seating slopes can be exactly calculated. The formula is given by Knudsen in *Architectural Acoustics*, p. 360.

[3] 'Royal Festival Hall Acoustic Tests', Peter Parkin, Architectural Year Book No. IV, pp. 225-229.

[4] This does not take into account the screening effect of the foyers, but relies solely on the auditorium structure.



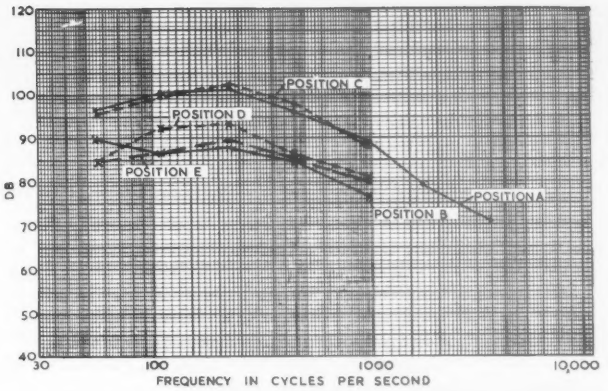


Fig. 2 (above): Noise levels per octave (three cases). Fig. 3 (right): Sound pressure levels for trains on track at different microphone positions

The main constructional requirements for the auditorium itself were thus established on an entirely theoretical basis. These requirements were later tested out in a practical way by being built up into the form of an experimental room. This room was built on the site itself. It was a reproduction in miniature of the structure of the auditorium walls and roof, and gave the opportunity of measuring what was likely to happen in practice.

The interaction of science and architecture is very important at this point. From the outset the London County Council's main acoustic consultant, Mr. Hope Bagenal, had advised that a massive surrounding wall would be desirable in order to reduce the sound penetration of the auditorium itself. Although I believe that the scientists did for a moment think of suggesting a continuous vacuum—until they worked out the pressures—this idea of using mass proved to be the simplest idea in practice. The conception of auditorium shape enclosed by massive walls, floor and ceiling and set in an enclosing envelope of rooms seemed to solve not only problems of sound insulation but also of planning and circulation. (Fig. 1.) The gain of space under the auditorium itself and the easy movement about this foyer to the four staircase points produced an arrangement whereby the auditorium could be filled or cleared quickly and with comfort for the audience. The use of space under and around the auditorium for the ancillary accommodation (restaurants, bars, cloakrooms, meeting room, etc.) gave a plan which had great advantages from the point of view of compactness and multiplicity of use. But at the same time these surrounding spaces with their promenades and vistas gave the opportunity for a modelling of spaces which had great potentialities.

From a sound insulation point of view the shape within a shape was undoubtedly important. Greater time for study could certainly have given an opportunity for assessing more accurately the sound resisting capacity of the external envelope. In practice this was regarded as an additional safeguard and the main attention was concentrated on the sound resistance of the auditorium walls. These constituted the inner fortress—a hard core of resistance to sound which had its entrances screened by the surrounding foyers.[5] Whilst this conception undoubtedly met the scientific requirements, I cannot say that it was achieved by logic. It came, like all ideas, out of the blue, as an arrangement which suddenly seemed to fit and to bring into order all the requirements.

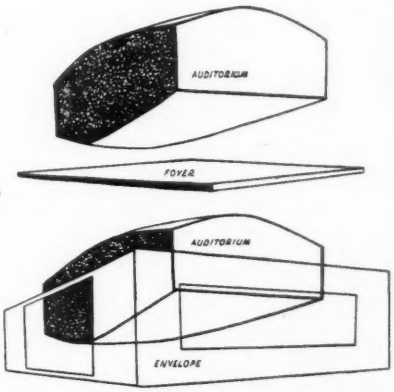


Fig. 4: Diagrams showing auditorium mass, foyer level and envelope. Right: Figs. 5 and 6; supports and staircases

The scientific investigations which followed showed how the original idea could be worked out without risk and certainly without waste. They also set and defined the engineering problem.

Structure.—The engineering aspects of the Royal Festival Hall have been described in a scholarly paper by Measor and New.[6] From a constructional point of view the main requirement was a system which could satisfy the need to carry the massive auditorium box (weighing 25,000 tons) on comparatively slender and widely spaced columns so that the foyer under the auditorium could be as open as possible. The structure around this centre core consisted of floors and bridges joined to each other by staircases and forming a continuous flow of levels, again supported on columns without infilling walls except at the corners of the building, where batteries of escape

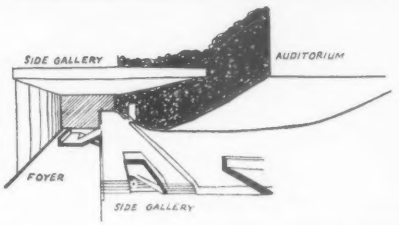


Fig. 7: Separation of side galleries from auditorium

[5] This again gave an opportunity for architectural expression: the solidity of the main auditorium walls was expressed by the Hadene stone: the absorption round the entrances by a cushioning of padded leather.

[6] 'The Design and Construction of the Royal Festival Hall', a paper read to the Institution of Civil Engineers by E. O. Measor and D. H. New.

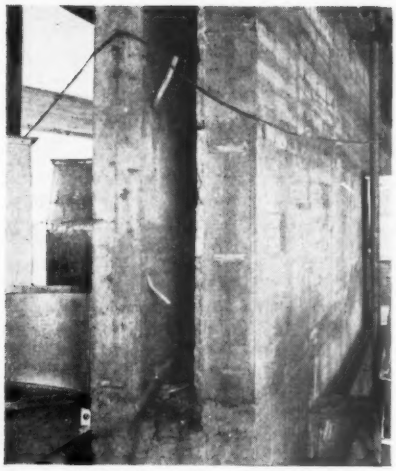


Fig. 8: The double wall construction

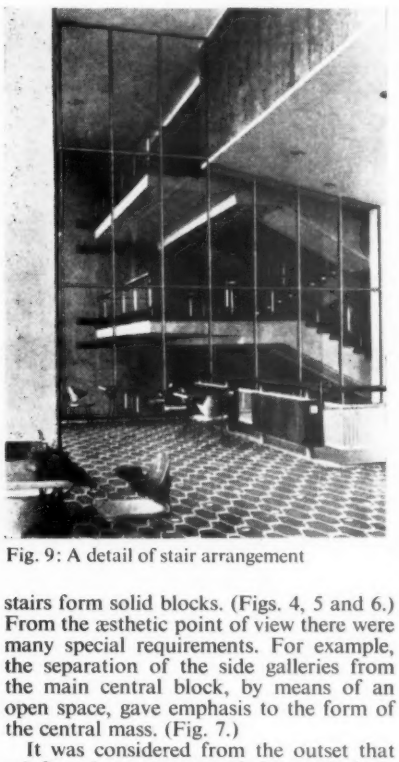


Fig. 9: A detail of stair arrangement

stairs form solid blocks. (Figs. 4, 5 and 6.) From the æsthetic point of view there were many special requirements. For example, the separation of the side galleries from the main central block, by means of an open space, gave emphasis to the form of the central mass. (Fig. 7.)

It was considered from the outset that reinforced concrete provided a particularly suitable form of construction. It allowed simple slab-like construction for the various promenades with the necessary cantilevering at staircase points. It also lent itself easily to the thickening out into continuous massive construction for the auditorium walls. Some hesitation was felt from the point of view of speed, and indeed some heavy concessions were made because of this. For instance, early ideas of using shell vaults and many opportunities for prestressing were abandoned. The simple homogeneous construction became composite at roof level, where bow-string girders avoided a great deal of strutting and shuttering and provided a remarkable erection time.

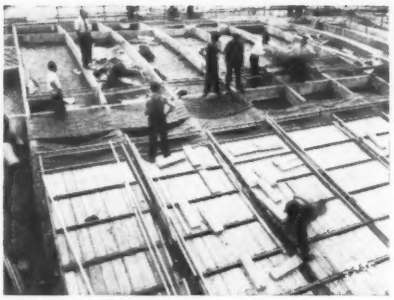


Fig. 10: Constructing the roof

The main column spacing of the foyer is based on a 25 ft. grid. The floor slabs of all the side galleries are 20 in. thick. The columns under the auditorium carry the double auditorium floor; the walls rise from a common beam in two entirely separate leaves. (Fig. 8.) The trusses rest on the inner wall leaf, and they supported the inner shell of the roof during concreting. On the completion of this concreting the bottom cores of the trusses acted as ties for what was virtually a concrete vault. The outer leaf of the roof makes use of precast centering supported from the inner leaf on sleeper walls but isolated from it by 2 in. of glass silk. (Fig. 10.)

There are several features that deserve special mention: the stairs, for instance (Fig. 9), and the balcony of the auditorium. The main balcony is designed as a torque tube—that is to say, it is built as a tube spanning 111 ft. 6 in. between side walls. The box formation of the beam resists the twisting motion caused by the eccentric loading of the balcony.

Theoretically, so far as the main structure is concerned, there are some interesting refinements that might have been considered if the time factor had not been so pressing. In theory at least, the structural isolation of the outer and inner skins is not so complete as it might be, particularly at roof level. So far as the Festival Hall is concerned this is not critical, as the train noises are of grazing incidence, but complete discontinuity of construction might have allowed greater resistance to aeroplane noise, even with thinner roof skins.

My own conception of the structure, which is entirely theoretical, is that it calls for a combination of support and suspension. If, for example, the auditorium floors, the inner leaf wall and the inner leaf roof vault had been the directly supported construction, the outer roof and the outer walls might have been suspended over this like a dish cover. (Fig. 11.) A perfect discontinuity of structure could be achieved. Within this construction the balcony would be separately supported on two main piers passing through the floor slabs. I cannot claim that this solution has met with any enthusiastic engineering support, and I am certain that it could never have been built within the time allowed. I am not at all certain that even the scientists would think it worth while. I mention it particularly now, because it emphasises the extent to which the scientific data can influence the idea and the form of a structure.

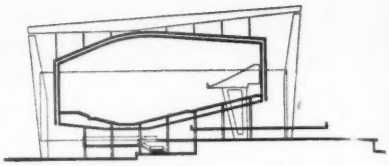


Fig. 11: Theoretical alternative design

Acoustics. The science of sound exclusion is clearly a major issue in the design of any concert hall in an urban area, and after some months of experience in the Royal Festival Hall we are beginning to realise just what an important contribution this inner quietness has made to the solution of the central problem—the acoustics of the auditorium itself. But while the problem of sound exclusion is an exact science capable of factual analysis, the scientific contribution to the subject of acoustics is recognised by scientists themselves to be incomplete. Mr. Parkin has said simply that science 'is a better basis than any other for the intelligent guesses that have to be made'.

In saying this, however, we must not overlook the interesting history of scientific work in the field of acoustics nor the important ground that has been gained. The main contribution of science to acoustics began in the 19th century. In our own country one of the earliest contributions was made by Dr. D. B. Reid. In his evidence before a Select Committee of the Houses of Parliament in 1835 (fire had destroyed the old House in 1834) he gave a clear indication of the direct strengthening of the voice by first reflections, and was clearly aware of the difference between this and prolonged reverberation. He also quite clearly recognised the intrinsic relationship between acoustic need—in this case oratory from any part of a room—and desirable shape; insisting on the square plan with ceilings sloping upwards behind the speaker to the centre. A ceiling of this kind was inserted in Barry's House of Lords for the use of the Commons with great effect. Tyndall's later recommendation in 1867 of splay walls behind the Speaker's chair is, as Bagenal says, probably the first recommendation of splay walls around a source—except that in this case the Speaker is not a source.[7]

The splays are in fact more suitable for that other type of auditorium, the concert hall. Knightley (the architect to the old Queen's Hall, built in 1894) was clearly aware of this and used convex walls behind the orchestra. Mr. Heathcote Statham also showed himself to be a pioneer by the important paper that he wrote for this Institute in 1899.

As these notes were being collected I came across another pioneering experiment in 1909, which in technique has such an interesting bearing on the Royal Festival Hall that it deserves to be recorded.

[7] Bagenal and Wood, *Planning for Good Acoustics*, pp. 145-149.

It consisted of a remarkable series of experiments to trace the source of a troublesome echo caused by the half dome over the orchestra of the Trocadero in Paris. You will remember that this building was one of the permanent buildings left by the Paris Exhibition of 1878. The first step was to assess the areas affected by the echo. The floor of the auditorium was marked out in squares of 2 metres, and twenty-two trained musicians acted as listeners—one in each square. The experimenter then walked about the stage with a clapper, and as the listeners perceived the echo they held up white cards so that their positions could be identified. A mathematical calculation based on this assessment indicated the danger points in the vault. This was then checked by a practical experiment which, though brilliant in its invention, was picturesque rather than scientific. A further experiment, based on a sound generating hut and a reflecting mirror, discovered the appropriate absorbent by the simple trial and error method of screening the mirror with various materials. The experimenter could cope with any problem. When the drawings of the dome could not be found he traced its profile at ground level by using a kind of plumb line in reverse, consisting of a gas-filled balloon which could be moved over the surface of the vault. The experimenter was in fact M. Gustave Lyon, who nearly twenty years later was responsible for the acoustics of the Salle Pleyel.

During the first twenty years of this century the subject of acoustics was given a firm, if incomplete, scientific basis. W. C. Sabine, of Harvard, had made his great study of the growth and decay of sound in enclosed spaces. His definition of reverberation and the possibility of calculating this in advance of construction opened up a new field of influence on the architectural design of auditoria. This knowledge was supplemented, of course, by the outstanding complementary work of Bagenal and Wood in this country.[8] But in order to realise just how recently this development has taken place it is only necessary to remember that great architects like Frank Lloyd Wright and Perret have relied on their own individual theories.

So far as I can remember them, two of Mr. Frank Lloyd Wright's views on acoustics were: (*a*) that in auditoria designed by Adler the sound was greatly assisted by the flow of ventilation from over the orchestra; (*b*) that sound was likely to build up under galleries, and that these should be opened out at the back to allow sound to flow through the gallery itself. These images seem to arise from air movement, not 'wave' movement, which is a very different thing. The speed of sound has no relationship to the flow of warm air from ventilation plants. There is also no case for allowing sound to escape from under a balcony, since in acoustics it does not build up into pressure—it is absorbed too quickly. If anything prevented a speaker from making himself heard under a balcony it would not be pressure. It might perhaps be a return echo from the rear wall which, if strong enough, would make it impossible for any speaker to continue for an appreciable time.

These remarks are not made in any disparaging sense. Indeed, in a field of work in which science leaves problems unanswered, and in which standards of quality are everywhere in evidence, it is not surprising that creative minds have thought out their own solutions.

In this field of acoustics, where so much is a matter of qualitative assessment, we have been fortunate in this country in having available the knowledge and judgment of Mr. Hope Bagenal. Indeed, I believe that Mr. Parkin, for instance, recognises that he has two working rules: (i) that acoustics is an art; and (ii) that in matters of quality Mr. Bagenal is always right.

It was in fact Mr. Bagenal's paper to the Acoustics Group of the Physical Society in 1948, and the discussion which followed, that formed the basis of the acoustic work on the Royal Festival Hall. From such starting points the broad musical requirements could be worked out. On the positive side they were (i) clear definition; (ii) fullness of tone—that is, richness, body, warmth, sonority, or perhaps what Mr. Bagenal has called 'singing tone'; (iii) the adequate blending of tone; and (iv) a proper balance of tone between the departments of the orchestra. There were in addition certain negative requirements, which were (i) no echo; and (ii) the reduction of intruding noise, which I have already discussed.

If we ask ourselves in what way science can provide an exact answer to these requirements, I think the answer will be that it cannot. The position is roughly as follows:

First, the single and dependable sheet anchor—the one reliable measurement in acoustics—is that provided by Sabine, namely, 'reverberation time'. The reverberation times of important halls in Europe and America have been plotted in relation to their volumes, and optimum values have been set down. This has been done by Bagenal and Wood in this country and Knudsen in America. The British and the American lines vary; perhaps because the former is calculated and not measured, and because it also includes halls particularly suitable for choral music. But these lines provide the important initial step.

Second, the subject of acoustics is being thought of in two ways. There is first the geometrical conception in which walls, ceilings, etc. act as mirrors providing a complicated series of reflections. The subject is usually taught this way in schools, and Salle Pleyel is, of course, an outstanding example in practice—except that the geometry did not go far enough and some long cross-reflections were overlooked. This geometric conception is still valid; though, because it is complicated, its predictions may be incomplete in practice. But the geometric conception is also being replaced by one which is still more accurate and in which the subject is not considered in terms of reflections but is thought of as a wave motion in which sound generated at one point sets the total volume vibrating like a jelly. In short, this is 'wave acoustics', to which notable contributions have been made by Cremer in Germany and Morse and Bolt in America.

Third, the contribution of Sabine, which remained stable for so many years, received a fresh impetus about 1926 from the introduction of valve and microphone techniques of measurement. This has resulted in a series of important contributions on surfaces and materials by such individuals as Meyer in Germany, Ingerslev in Denmark, Bolt and Beranec in the United States and Parkin in this country.

Fourth, there are also in general two main schools of thought in acoustics. First there are those who believe in the reflection of sound outwards from its source (Bagenal, Bolt, Meyer, Ingleslev, Parkin, etc.), and those who believe in absorbing sound around the source (in general these experts, like Somerville in this country and Fürrer of Switzerland, are usually basing their work on broadcasting and studio experience).

Fifth, the Building Research Station has for some time been conducting an important attempt to assess musical opinion on a more scientific basis. As a result of this we have at least a guide to what is required. This guide, though not complete, is more reliable than separate independent subjective judgments. It brings out the consensus of musical opinion in relation to existing halls and therefore sets a standard. But it is also a technique for the massed listening tests by which a new hall can be assessed.

This is the general background. But there is also a major difficulty in designing a large concert hall. Fine halls like the Leipzig Gewandhaus were designed to hold audiences of 1,000-2,000. The present-day requirement is for halls with a capacity of 3,000 or more. As halls have increased in size orchestras have been reduced in numbers. Also as halls increase it is clear that it is difficult to keep reverberation time sufficiently long to maintain quality of tone.[9]

It was felt, however, that several broad decisions could be made. The elimination of echo could be most readily achieved by a rectangular hall with a straight rear wall rather than by means of a fan-shaped hall (though this was based largely on experience and not on scientific knowledge). Suitable absorbents were required on the rear walls, and the angles of walls and ceilings. The rectangular shape was modified on the side walls close to the orchestra itself to deal with cross echoes. Fullness of tone could be gained by providing the longest possible reverberation time: this in itself required a maximum volume and a minimum of absorbent areas, but both these requirements in turn presented a risk of echo. The need for fullness

[8] Ibid.

[9] The Leipzig Gewandhaus built in 1894 had a seating capacity of 1,500 and a calculated reverberation time of 2·0 seconds at 500 c.p.s. with a capacity audience. The Queen's Hall, seating over 2,000, had a calculated reverberation of 1·7 seconds. The Salle Pleyel, with an audience of 3,000 and after the acoustic corrections of 1928, appears to have a reverberation time of about 1·45 seconds.

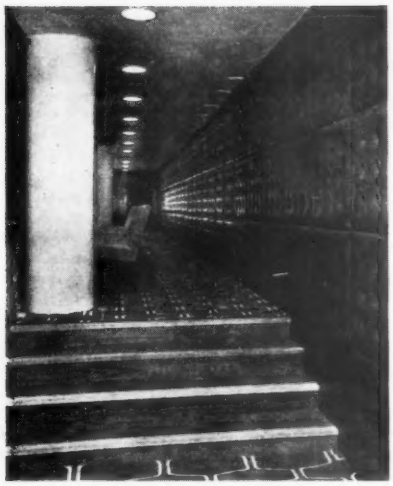


Fig. 12: Absorbent leather panelling

of tone and at the same time definition also introduces an element of conflict. Fullness of tone through reverberation means a prolongation of sound obtained by a complexity of reflections. Definition results from a direct sound path from every instrument to every seat, and it is this requirement that gives rise to the raked seating of the orchestra and the raked seating of the audience. Definition can be built up by first reflections arriving at the listener within a specific period of time, but the reverberant sound arriving after this period, though desirable for musical tone, will hinder definition. This gives rise to a nice study in interaction which has yet to be pursued. It also gives rise (if you are a supporter of the reflector school of acoustics) to a suspended canopy over the orchestra for first reflections. This canopy will hang within a volume made large enough to give a long reverberation time.

Now it is quite clear that these basic requirements do not solve any artistic problems for the architect. They do not lay down a final shape—indeed, about most shapes there are conflicting views and the architect himself must take some broad decisions. In the case of the Festival Hall the decision to adopt a rectangular plan form did not, of course, produce any artistic problem. The narrowing down at the throat to enclose the orchestra and to prevent lateral echoes can be satisfactorily handled. The raked floor of the orchestra and the audience, and the desirable slope of the ceiling can all be related to the plan shapes and can provide a cubic volume which is acceptable. It is also acceptable to hang within this volume the canopy over the orchestra and to treat this as an essential part of the design (although I must point out that, because it hangs, many people will persist in regarding it as an afterthought). All these things are generally acceptable, but the requirement to provide splayed walls from floor to ceiling on either side of the orchestra results, to say the least of it, in an awkward piece of solid geometry. I believe that there are here

Fig. 13: Fixing polished plywood absorbent panels

some gaps in the scientific knowledge (there is certainly some scientific disagreement) which make the architect's problem difficult and which demand further study.

But if the work on the main form of the auditorium is still unresolved there have been many advances in dealing with its finishes and surfaces. Perhaps I should say at this point that in the Royal Festival Hall the problems of sound insulation and internal acoustics are clarified into, and solved by, two separate structural systems. The sound insulation is dealt with by the surrounding double-skinned wall—the acoustics by an independent internal lining. The treatment of this internal skin offers great scope for the designer's contribution and this scope grows with the development of scientific knowledge.

For example, not many years ago the finishes associated with acoustics were almost entirely absorbents of one kind or another, added to existing buildings for correction purposes. Few of these introduced any design problem. Now, however, Kosten of Holland, Meyer of Germany and Knudsen and Harris in the U.S.A. have provided information relating to materials and surfaces which at once widens the architect's scope and range of selection. The leather panelling on the side rear walls of the auditorium of the Royal Festival Hall is an example of a straightforward absorbent treatment which has given a suitable surface finish. (Fig. 12.) But in addition to this increasing knowledge, materials have been developed into systems of construction which can play a vital part in acoustic design. An example of this, for instance, is the work on absorbent treatments by resonant structures which has been developed by Goyder in India, Ingerslev in Denmark, Rschevkin in Russia and explored by Parkin, Purkis and Somerville in this country. The theory is broadly that any system which can vibrate can be used to absorb sound energy. The absorption will be greatest when the natural frequency of the vibration in the system is nearest to the frequency of the sound vibration.

Absorbents of this kind were introduced into the old Queen's Hall and the Gewandhaus at Leipzig in the form of plaster on lath and wooden panelling. Today such absorbents are deliberately introduced and scientifically calculated to carry out such functions.

There are three elegant examples of this

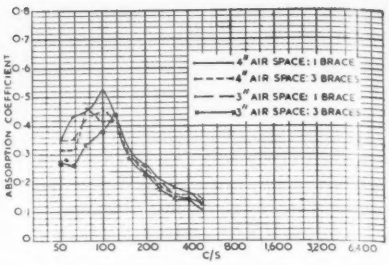


Fig. 14: Absorbent co-efficients of wood panels

theory in the Royal Festival Hall. The first is the use of panel absorbents on the side walls. In this case ⅜ in. plywood panels, with an air space behind and a polished surface, reflect the high frequencies but vibrate and therefore absorb the low frequencies. (Figs. 13 and 14.) They are selective absorbents. The second is the use of strip or split absorbent panels of the Copenhagen type. These are used on the splay walls. They are mounted panels composed of vertical strips designed so that they conceal the absorbent behind. (In this connection I should mention in passing the treatment of the lift areas and the ceilings outside the auditorium itself.) But the third example, although it left its mark, was never in fact used. It is perhaps the most original ideal of all. It consists of a vessel with a throat—a milk bottle if you like—which can be inserted into ceilings or walls and in which the internal area acts as a spring for sound waves. Vessels of this kind can absorb the sound energy from a cubic volume which is many times their own. They lend themselves in particular to the treatment of certain acoustic difficulties arising from tones which decay much more slowly than the general reverberation time. The ceiling of the Royal Festival Hall was constructed with about 1,200 2½ in. diameter holes to make provision for this treatment if the need arose.

Now these systems have left their mark on the Royal Festival Hall in the design of ceiling and wall panels. But I think that we have only really started to explore this problem of surfaces. The Copenhagen, or knucklebone, absorbent is one of the first examples of skilled design applied to a scientific problem. A wide field has still to be covered. We have demonstrated, for instance, in the Royal Festival Hall the great possibilities of tuning by means of filling up the air spaces behind resonant panels. This was done by the use of removable panels.[10] The hinged panel giving an adjustment of air space is an obvious development which is already theoretically worked out by Jordan of Denmark.

The developments of wall surfaces might be considered in other directions. Take, for instance, the question of diffusion. We know that a uniform distribution of sound energy throughout the auditorium is of great value from the point of musical tone. We also know that the elaborate ornament

[10] The tests on these panels are described in a paper by P. H. Parkin and N. J. Purkis, 'Sound Absorption of Wood Panels in the Royal Festival Hall', published in ACUSTICA, Vol. 2, 1951.

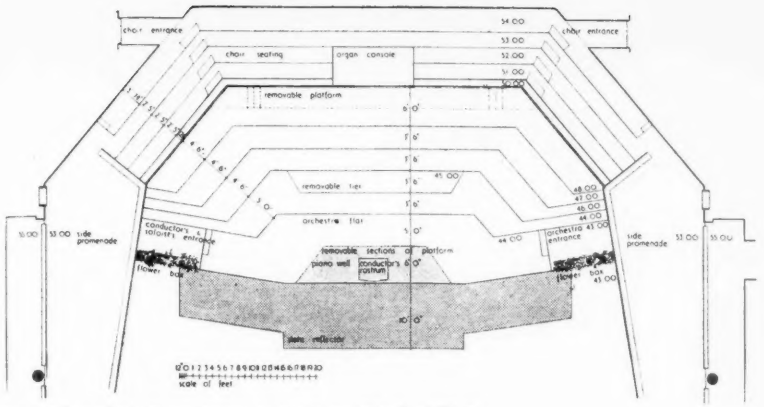


Fig. 15: Plan of platform layout at the Royal Festival Hall

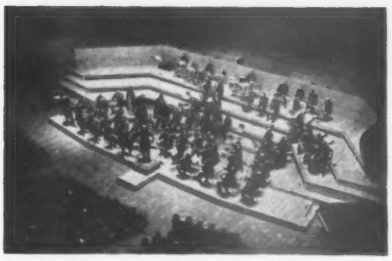


Fig. 16: The orchestra at a test concert

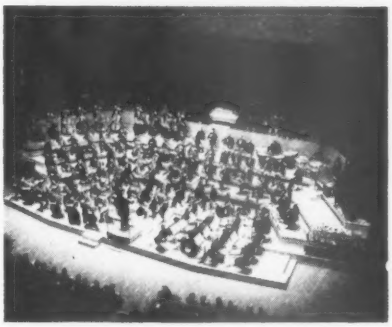



Fig. 17: Orchestra arrangement by Mr. Leopold Stokowski

of many historic interiors has played a great part in producing this effect. The cylindrical forms used on the walls and ceilings of American and Swiss broadcasting studios are attempts to produce diffusion in terms of modern materials. Artistically I have never been able to accept them. I have always suspected that there was something wrong. I now suspect that what is wrong is that they diffuse on one plane only, and what is needed is multiplicity of diffusion—randomness—a kind of basket work of surfaces—which offers great possibilities to the designer. It seems to me that in all these matters the solution by the scientist who knows the facts is very often limited to one formal idea. The designer's contribution is to increase the range of formal solutions, and in doing this it may well be that he will stimulate new scientific advances. What is needed is a joint effort—'design research'—in which individuals can stimulate each other.

It is not too much to say that musicians, architects and scientists working independently can only make limited advances. This is nowhere more true than in the case of the stage arrangement itself. The limitation of depth from front of orchestra to back of choir, the raked arrangement of the instruments to avoid screening and the positioning of reflecting surfaces form an important step in acoustic development. The contrast between the stage lay-out that we have adopted (Figs. 15 and 16), the American flat stage, the Italian Opera House, and at the other extreme the Wagnerian theatre stage (where an orchestra of 130 is placed under the stage itself) is a contrast not only of lay-out but in the end of musical taste. The Festival Hall stage has still to be fully exploited from the point of view of orchestra lay-out. The auditorium is an instrument, and its stage arrangement is an essential part of the tuning. Mr. Stokowski's experiment, in which he re-arranged the departments of his orchestra (Fig. 17), was a notable example of the effect of arrangement on quality of tone. There is a great deal of work to be done in this direction, and it must be done through the collaboration of musicians, scientists and architects.

The assistance of science will be necessary in assessing the results. Here the new techniques of measurement are of great importance. Apart from the measure of reverberation time, which should clearly be extended to every part of the hall, Mason, Moir and Somerville have shown how the build-up and decay of sound in auditoria can be analysed by a study of patterns as recorded on a cathode ray tube.[11] Several workers in acoustics have clearly recognised the need to relate such quantitative and objective measurements to the qualitative and subjective judgements of listeners. The listening tests carried out by the B.R.S., which draw together musical opinion, are of great importance. I should add that, thanks to science and to those assessments, we do at least know exactly what we have achieved and exactly where we stand. That is important, not only for the Royal Festival Hall but for the whole development of acoustic knowledge.[12]

Internal Climate. There is one other aspect of building in which science can play a major part, and that is in creating what might be called the internal climate of the building. This is, of course, its lighting, its warmth, its air movement and humidity. I am not going to say a great deal about this so far as the Royal Festival Hall is concerned. In making this omission it is not because I disregard or disrespect the pioneering work of such men as Allen, Hopkinson or Bedford, or the many unnamed scientific workers who have contributed to the development of lighting or heating techniques.

The omission is made because, in fact, basic scientific data did not impinge on or influence the design of the hall to any appreciable extent, though, indeed, there are some conclusions to be drawn from this that are worth mentioning. The first is that the quality of light in an auditorium—as opposed to its quantity—seems to me as much a question of æsthetics as the quality of musical sound in acoustics; in fact it is a question of art and not of science.

In saying this I am well aware that scientists themselves have moved away from the mere assessment of the quantity of illumination. It is an important step that they should now be studying questions of glare, brightness and comfort. But as Hopkinson has pointed out, the study of comfort is the study of whether there is a sensation of physiological pain, irritation or distraction. It is not a question of whether a person likes or dislikes an effect, or whether his senses are stimulated, titillated, stunned or merely rested.

This æsthetic factor is, of course, a vital one in a theatre or concert hall. For while it is true that a certain number of people are working—for example, the orchestra—and that good lighting may well affect the precision and speed of their playing—it is equally true that for the audience the lighting and the architecture are inseparably combined to create the mood, the feeling and the general atmosphere.

It is for this reason that lighting methods which may be efficient and desirable in some types of building—the classroom, for example—have limited applications in the auditorium. It may be necessary to have a fine illumination at the working level (the stage—in the centre of the drama), but in the area that surrounds this centre, shadow may be as important as light itself. This naturally leads to two distinct categories: the general lighting of the hall graded and controlled by dimmers and the lighting of the stage itself (Figs. 19 and 20). In the auditorium of the Royal Festival Hall the soft changing light of the rippled ceiling, the lenses that give out brilliance, the small points of light in the fronts of the boxes that give liveliness and glitter, are all there for effect, and I do not think that science

[11] T. Somerville. 'Acoustics in Broadcasting', a paper to the Building Research Congress, Division 3, 1951.

[12] P. H. Parkin, 'Acoustics of the Royal Festival Hall, London.' *Nature*, 18 August 1951.

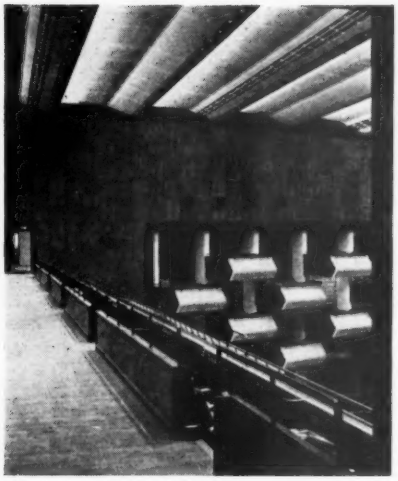


Fig. 18: Auditorium lighting

Fig. 19: Balcony front and general lighting

has played much part in this (Fig. 18). For the purpose of record, however, it may be interesting to note that the auditorium lighting ranges from 8 to 9 ft. candles during intervals (and is set at 1 to 1·5 during the actual performance). A platform lighting of 18-25 ft. candles appears to be an acceptable level, and is obtained from 25 lanterns covering an area of 5,200 sq. ft. I should say that this stage lighting can be formed into a third system complete with spots, etc., when ballet is being performed.

As for that other element of climate, the internal atmosphere, its scientific aspects have not affected very greatly the design of the hall. It created a number of technical problems. To prevent sound transmission, each separate element of the plan (the auditorium, the foyer and restaurant, the meeting rooms) (Figs. 21 and 22) had to

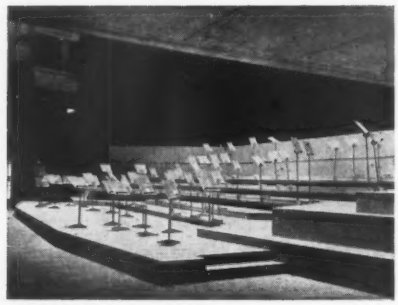


Fig. 20: Platform lighting

have its separate warming installation,[13] but apart from the rippled ceiling of the auditorium, which to some extent was designed as a result of ventilation inlet problems, there is little visible effect. What is certain is that the technical requirements of ventilation are very complicated for a building of this kind, though they must be known in the initial sketch stages. It should be mentioned that science lent a hand in devising the baffles which absorb the sound from the air as it is drawn into the building, and also that the system of warming in winter and cooling in summer is associated with an important scientific experiment. Dr. Roxbee Cox, of the Ministry of Fuel and Power, designed a heat pump which was placed during the exhibition in an adjacent arch of the Hungerford Bridge, and which is connected up to the concert hall system. The heat pump conserves the latent heat from the water of the river Thames, and by building this up provides warmth which has already been used in experimental tests. During the summer it was used in reverse to provide some cooling for the auditorium.

Finally, it is worth noting that the 'flora' which enrich the interior, by living in this internal climate are themselves kept alive by science, for they are an interesting example of 'hydroponics'. In order to avoid the problems of drainage these plants are placed in sealed pots, their roots embedded in a mixture of exflorated mica and sand for anchorage. This mixture is charged with a year's supply of the necessary nitrogen, phosphates, potash and trace elements, additional nourishment being parcelled out from time to time in the form of a solution if this is found to be necessary for a particular plant.

At the beginning of this paper I stated, perhaps too briefly, that science could produce facts which might influence the form of art, but that these facts in themselves do not make that art. Perhaps I should add a further word of explanation. In considering the influence of science on the design of the Festival Hall, I hope that I have shown that an influence of this kind can be profound. It is at the very least the most dependable starting point that we possess. I hope that I have shown also that scientific influence in architecture is not limited to the engineering or structural aspect.[14] In the Royal Festival Hall the requirements of sound insulation and acoustics outweigh in importance the structural considerations and actually condition them. Whilst engineering forms are likely to predominate in, for example, a factory, there are many other building forms where they may be, architecturally speaking, irrelevant. Buildings, like natural forms, fulfil many functions at one and the same time, and any one or several of these functions may be emphasised in the completed conception.

The architectural problem is to discover in all these conflicting pressures some spirit of order, of harmony and of coherence. Science is of great assistance in clarifying issues. To this extent it assists the designer in his problem.

I have described the way in which science impinges upon basic conception. But I hope I have made it clear that it leaves unsolved all the architectural problems. In a building like the Festival Hall the designer must still face the problems of ordering and controlling the internal spaces, of creating the sense of occasion, the right atmosphere for a large non-utilitarian building. The answers to these problems rest in an architectural world—a world of light, colour and form in which we have no guide, except our own senses and our feelings.

Criticism must assess the extent to which scientific knowledge has been used. But this cannot be used as a measuring rod for the finished work of architecture. It must go on to explore the language of the forms themselves.

DISCUSSION

Mr. Hope Bagenal, D.C.M. [*F*]: My honourable task and my pleasure this evening is to say thank you to Leslie Martin for his paper and to convey to him the appreciation of this audience and of the Royal Institute of what he has done—he and Robert Matthew—in building the Royal Festival Hall. We also appreciate what he has just told us about his thoughts on the hall as well as his analysis of the design. The two together are interesting and may be historical.

I am one of the godfathers of the Royal Festival Hall, and I have often thought, like other godfathers, that my catechisms and lessons and adjurations probably counted for very little, compared with the strong natural faculties of the parents; and that, I think, is so in this case. Leslie Martin has shown us in his paper some of those faculties that have gone to the creation of the hall, his mastery of real difficulties, his powers of discrimination, and also the spirit in which he worked.

I should like to touch on that. He and Robert Matthew saw all the anomalies and the confusion, all the contradictions, but

[13] The main foyer is maintained at a temperature of about 65 degrees F. by means of low-pressure hot water heating from gas-fired boilers, the heating units being floor panels and concealed convectors. Air conditioning to the auditorium provides an air change every 12 minutes and is designed to maintain in the winter season a temperature of 67 degrees F. with a relative humidity of 50 per cent. Separate plants are used for meeting rooms and restaurant.

[14] See F. Samuely, 'Force and Form', a paper to the Architectural Science Board, 15 February 1949.

they did not despair, and they did not even become irritated. I was getting irritated sometimes, but not they. I was always struck by their courtesy and goodwill, and so it was a real pleasure to work with them. There was Edwin Williams, as well, with his wonderful staff work. I must refer to that because, in sound insulation, success depends on hundreds of little details which have to be remembered and carried out. There were others—talented young men, assistants—all forming a very good design team and all, I think, contributing to that spirit of goodwill. And this goodwill seems to have gone into the hall.

For me the real thing that matters in a great public building is that it should become a home for the mind, a home for the imagination; and that, I think, is just what the Royal Festival Hall is becoming. Music lovers go there because they like it. It is spacious and hospitable; and compared with the old halls of my day, it is really a kind of paradise. It does all its various jobs fairly well; and it does one or two of its jobs very well. It is in the performing of a number of different jobs well that science in architecture so often seems to fail us, whereas it is so useful in other activities. It is because a building has to do so many different jobs.

If we take the Festival Hall as an example, to begin with it ought, for choral music, to have a longish reverberation: it ought to be a modified church. For orchestral music it ought to have a moderate reverberation, to be a modified opera house. Then for the big organ it ought to have a long reverberation. Again, at one period, it was going to be a cinema, and this would have meant going back to a very short reverberation; fortunately, that was staved off. Again, there was its use for ballet, which—I confess—entirely bowled me over. But it did not bowl over the architects, and I have learned lessons from them.

I feel this paper shows that they have respected the past, that they have faith in the future, and that they have accepted the full briefing of their own time. That is a difficult thing to do, but it is what they have done, and it is one of the reasons why I should like specially to thank Dr. Martin for his paper this evening and to move a vote of thanks to him.

Mr. W. A. Allen [*A*]: Dr. Martin has spoken tonight of scientific work rather as though he were taking what it had to offer and giving nothing back except in the form of architecture. I should like to put another point from the scientific side—that through the work of Mr. Matthew and his team a very considerable contribution to the science of acoustics became possible. That contribution could not have been made in any other way, I think, than it was made—that is to say, by their full, very detailed and very sympathetic collaboration in taking up and handling so competently every idea that was put before them in the way of acoustics, illumination, or anything else which happened to attract their attention at any moment.

So far as I can recollect, something like

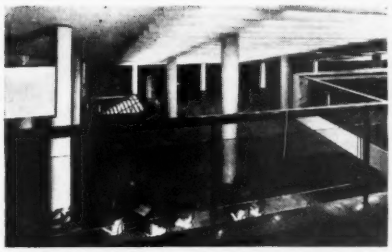


Fig. 21: Foyer level under the auditorium

a hundred and twenty-five or a hundred and fifty meetings took place on acoustics during that time, and that compares very strikingly with the few meetings we envisaged at the start. Dr. Martin will bear me out that it was not all because the acoustics people were pestering the architects. It seemed to be rather the other way round. It all worked out very nicely, and the hall incorporates everything which was suggested and agreed upon. As a hall, it expressed very completely the state of knowledge as it stood at that moment. Therefore, it became a great piece of operational research. We knew exactly what was in the building, why it had come there, and what was its theoretical basis.

We were given by the London County Council, through the good offices of the Chief Architect, extraordinary facilities for the study of the building and for testing in it. They provided four audiences of three thousand people and the orchestras that were necessary for study, and it was not only to tune the hall: it was a contribution to science. We were able to learn an enormous amount from the building, and this has very greatly strengthened the whole subject of acoustics in this country. I do not think that in any other country in the world you would find a better monument to theory and practice than is bound up in the design. No other country can, it seems to me, show that kind of co-operation between architects and scientific people working so powerfully.

I should like to say here that my colleague, Mr. Parkin, of whom Dr. Martin has spoken so often and so highly, wishes me to express his regret that he cannot be here to put forward these sentiments himself.

Dr. Martin touched upon the world of imagination, where one comes to the problems of light, acoustics, colour, and so on. He mentioned the tendency to depart now from the idea of studying quantities only. It is true, of course, that scientists and engineers both like to study quantities. That is partly because they like exactness. But now, partly through collaboration with architects on this kind of work, they have come to a rather different viewpoint, which is that you cannot take the exact side of a subject like illumination or acoustics—the side, that is to say, which can be written down in figures—and accept that as approaching any reasonably balanced aspect of study.

Dr. Martin has referred to our listening studies. I am horribly disappointed to

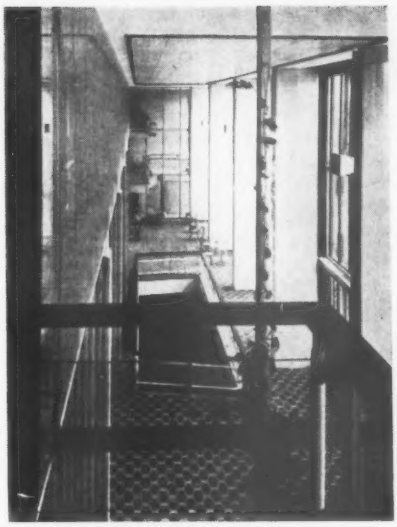


Fig. 22: The restaurant

learn that Leon beat us to it by nearly forty years on these listening studies. We thought we were first with our operational investigations. But as Frank Lloyd Wright himself once remarked, when he discovered someone had beat him to something, there is comfort in the fact that it is perhaps almost as useful to have thought of it yourself when you did not know it had been thought of before. Originality still has its value!

It remains true that the scientists in the scientific study of subjects like heat and sound are all turning, not towards the physical side of the subject, but towards the subjective side. That is the side which resides in the human system; in the mind of man. That is where attention is now being focused. It is true, of course, that art and science meet extraordinarily intimately in this aspect of architecture, because the impressions which are formed about a building are, in the first place, those which are impressed upon one by reason of shapes rendered visible through illumination, and then through the feelings one has about the building. These relate to heat and cold, the feeling of freshness, a sense of invigoration; a feeling about the illumination which may make you gloomy, or disappointed, or gay, or vivacious; or the acoustical feelings which may make you excited or give you a sense of majesty, as in a cathedral, and so on.

All these feelings, which are distinct from the response to a set of shapes, are becoming the subject of examination, and they are, I think, helping us now to get a clearer control and power over certain aspects of building design which are very important. Every architect will agree that if he is to make people feel gay or happy, or calm and quiet—as in a hospital—or invigorated or excited by the music at a concert, he wants to have as much control as he can. To a large extent, an architect's æsthetic intentions reside in shapes, and they are impressed upon the mind or in the

feelings which are produced. These feelings are produced by three senses in particular—the tactile sense, or the skin receptors, for heat; the eyes for light; the ears for sound. Scientists are now turning to the study of human beings much more carefully and exactly and broadmindedly. There we are certain to move a little further on to the territory which Dr. Martin had, I think, staked out for art alone. It is the essential meeting-ground; and that side of the subject will be the real place where scientists and architects will find many of their mutual interests for the next few years.

Mr. Robert Matthew [*A*]: I am glad of this opportunity to add a word, and it will be brief, because Dr. Martin has given us a very clear statement indeed of what was quite a complicated set of circumstances. He has given a very vivid picture of the various ways in which science has contributed to the solution of the many difficult problems with which we found ourselves faced in building the Festival Hall.

In paying my tribute to the way in which he has presented this paper, I should also like to pay tribute to the very important contribution he himself made to the design of the hall. I feel that its success, in so far as it has been a success, is in very large measure due to his own capacity, his outstanding capacity, to link up scientific facts and opinions—because they are not always facts; they are very often opinions—on the one hand, with the architectural problems on the other.

I should like also to take this opportunity to pay tribute to two very different kinds of scientific advisers, both engaged on the subject of acoustics. I shall never forget our first visit to the site before anything was done, and the old buildings, including the Lion Brewery, still remained there. Hope Bagenal and myself, Parkin and Allen from the Building Research Station, had all turned up for the first time, to try to measure up to the size of the problem of external noise. Here we had on the one hand the B.R.S. mobile van, with its valves and cables and measuring instruments, recording and measuring very delicately and carefully. On the other hand, there was Hope Bagenal, stalking about the site unattended and almost unequipped, the only item of equipment he carried with him being a cardboard tube about 3 ft. long—the sort of thing you use to wrap drawings in—which he attached from time to time first to one ear and then to the other. We were, indeed, fortunate, as architects, in having such an unusual and happy combination of scientific outlook.

I should like to supplement Dr. Martin's paper by one word on two kinds of scientific contribution to the building. Perhaps I should not say two kinds, but two different aspects. This may, though I am not sure that it will, meet the point about accuracy. First, there is pure science, and if we take acoustics as an example, we had an excellent illustration of this in one or two lectures at the Building Research Congress last September. The lectures by Cremer and Meyer, I venture to say, were almost unintelligible to the average architect, and the scientific data which they presented were, I think, of very little *immediate* practical value to the practising architect. What is essential is for the architect/scientist middleman, so-to-speak, to translate the purely scientific data into a form useful to architects and also to apply it to the practical problem of materials and forms of construction. We have had, in fact, on the Festival Hall, the ideal middlemen, if I may use that term without disrespect to them, in Messrs. Bagenal and Allen, and also in Professor Bolt from America, who had the unusual qualification, I believe, of degrees in architecture, physics and music; a combination particularly suitable to a consideration of the acoustics of the auditorium.

There are obviously still many gaps in applied science. For instance, we found it quite impossible to get the exact colour of strip lighting, both in the auditorium and in the foyers, in spite of a good deal of experimentation. The same could be said about the whole range of materials, especially from the point of view of their performance as reflectors or absorbents.

During the building of the Festival Hall—and I think Mr. Allen touched on this—our knowledge, by which I mean the knowledge of the whole team of architects and engineers with whom I had the privilege of being associated, increased by leaps and bounds. I hope, if it is only for the sake of the further propagation of the scientific truth, that we shall be allowed in the not too distant future to complete our building.

The Chairman: I have been very conscious all through the evening of being in the presence of experts. That does not prevent me from expressing my admiration for the way in which this most interesting subject has been treated. If I may quote from Mr. Matthew, I should like to say, without perhaps being too conceited, that Dr. Martin has made this subject intelligible to the average architect.

Dr. Martin: I do not think that there are any points about which I need say more. I should like to thank Mr. Hope Bagenal and Mr. Allen for the very kind vote of thanks which they proposed and seconded. I hope to acknowledge in the printed text the work that I have drawn upon in preparing this paper, but I owe a special debt to Mr. Hope Bagenal and Mr. Parkin, who have provided both information and comment.

Perhaps before I sit down I should thank publicly my own colleagues of the London County Council—Robert Matthew, Edwin Williams and Peter Moro—with whom I have worked so closely; and in particular Robert Matthew for giving me the opportunity of working on this building.

Review of Films—28

The country of origin and date of release are given first. The film is in monochrome unless otherwise stated. The sizes (35 mm. and 16 mm.) are given. Sound films are marked 'sd', and silent 'si'. The running time is given in minutes.

(*F*) *indicates free distribution.*

(*H*) *indicates that a hiring fee is payable.*

Research and Modern Housing

Britain 1950 (*F*)

Summary. The contribution made by the Building Research Station to the solution of the post-war housing problem in Britain. An example of the day-to-day work of the Station showing the care and thoroughness of the scientific study which precedes every recommendation. War-time housing problems recalled: the scientific work which led to the formulation of the standards of strength, durability, insulation, etc., adopted as the criteria for the new houses. Designs of 'non-traditional' houses studied to ensure satisfactory living conditions and economic maintenance. Practicable suggestions for improving the performance of traditionally-built houses.

Appraisal. A film which, on the whole, explains adequately the experiments which have been carried out at the Building Research Station with regard to housing standards and the use of building materials. In parts a little too technical for lay audiences. Too much emphasis is given to laboratory tests, which are not always fully explained. A difficult subject, however, generally well and informatively treated. In the main, the photography is good and the commentary clear and interesting.

16 sd. 35 sd. 30 min. Central Film Library, Government Building, Bromyard Avenue, Acton, W.3. (Ref. No. U.K. 1262).

Pre-Stressed Concrete

Britain 1950 (*F*)

Summary. Examples of the uses of pre-stressed concrete; properties and load bearing qualities; making and testing pre-stressed concrete sleepers.

Appraisal. To anyone not familiar with the principle of pre-stressed concrete, the film would convey little; to those with some knowledge already, it would convey nothing that was not already known. There is no explanation of the principle of pre-stressed concrete, only a series of unrelated shots with no linking theme. The photography is poor, many of the shots being underlit, and the editing amateurish: the captions are too small and are held for too short a time.

16 si. 16 min. Richard Costain, Ltd., Dolphin Square, S.W.1.

The R.I.B.A. Dinner 1952

Held at Grosvenor House, London, on 20 March 1952

The President, Mr. A. Graham Henderson, A.R.S.A. in the Chair

The President replying to the toast of the R.I.B.A. and its Allied Societies

The Loyal Toasts, proposed by the President, having been honoured, the Right Hon. James Stuart, M.V.O., M.C., M.P., Secretary of State for Scotland, proposed the toast of 'The Royal Institute of British Architects and its Allied Societies'. He said: I rise feeling very nervous about addressing such a wonderful gathering as this. I must confess that I had no idea either that I was to be confronted with such a large audience or that the present Leader of the Opposition might be amongst that audience. However, I assure you that it was not my intention to make anything in the nature of a political speech. I realise that architects are above such sordid matters as party politics. I can only presume, while we regret Mr. Attlee's absence, that he is endeavouring to do a little architecting in the political field.

I regard it as a very great honour, however, to be asked to propose this toast. I realise that your President is the first Scotsman to be elected President of your Institute. I have known Prime Ministers who have been Scotsmen, and I am glad to think that the Royal Institute of British Architects is following the right lines in electing Mr. Graham Henderson its President. I understand that he was born in New Zealand, but New Zealand and Scotland have many good things in common. I am glad to find that England holds Mr. Graham Henderson in no less esteem than does Scotland—because I believe that before coming to occupy the position of great eminence which he now holds he was an Associate Member of the Royal Scottish Academy, and he is a Past President of the Glasgow Institute of Architects and of the Royal Incorporation of Architects in Scotland.

I am not going to make a long and serious speech about architecture, because the truth is that I do not know anything about it. Whether that is a relief to you or not I cannot say. I do feel for you, however, the greatest sympathy, working as you do in the times in which we live, which are for you, I realise, times of great difficulty. The castles of which you dream must for the present remain castles in the air. I should like to think that they would achieve realisation in the near future, but I am afraid that there is bound to be some gap, because, as we all know, the position of this country today is so serious that we cannot afford, owing to the materials situation and the economic position generally, to go in for the building of those beautiful buildings which we all wish to see once again.

You have, however, a great work to perform even in the austere days in which we are living, because, without talking politics—and this is above politics—it is the duty of any Government today to do all that it can to see that our population is rehoused in the best possible manner, allowing for the great difficulties which confront us, both financial and material. I speak with great diffidence and subject to correction, seeing that the Minister of Works is sitting quite near to me, and he has all these difficulties of which you know in regard to supplies of steel, bricks, cement and so on. On the other hand, I say in all sincerity that anything which you in your profession can do to reduce the amount of scarce materials such as steel used in the building of modern houses the better. That is what we want to see, and what we shall try to encourage by space saving, while at the same time maintaining those standards below which we must not fall. You and the Government have a great work to do in this field, and we must concentrate on trying to carry it out.

Edinburgh happens to be my birthplace, and I maintain, in the presence of a Scottish President of the Institute, that in Edinburgh you can see fine buildings and fine architectural layouts. I am afraid that we cannot rise to such things today, but even a town like Edinburgh is capable of improvement, because it was an Edinburgh man who suggested that the Scott Memorial in Princes Street should be presented to Glasgow—in order to improve the look of Princes Street! In thinking of the steel shortage of today I remember the caddie from St. Andrews who had never left St. Andrews in his life until some of his friends thought that for the good of his soul or to improve his education he ought to see the fine city of Edinburgh, and so they gave him a return ticket to Edinburgh. I am reminded of this because of the present-day difficulties in obtaining steel for constructional purposes, since in a railway station we see a good deal of steel used for the roof. Having a pretty good idea of his habits, his friends met the last train from Edinburgh and fished him out of it, and then asked him what he thought of Edinburgh. 'Oh,' he said, 'it's a mighty queer place, Edinburgh; it's a' roofed in.' It appears that he never got outside Waverley Station!

The art of architecture is a mystery to me, like appearing in television, which I had to at the end of last week. I always admire anybody who can get the staircase to end up at the same height as the first floor. That calls to my mind the minister in Scotland who was preaching about the difficulties and dangers of this world, and who ended up by saying 'Brethren, this is indeed a perplexing and a very difficult problem. We must just look it straight in the face and pass on!' You may wish to pass on to the next speech and I do not want to emulate the gentleman who, before making his first public speech, rehearsed it to his unfortunate wife until he was word perfect. When he returned home his wife asked him how it had gone off, and he replied 'I can assure you that it was moving, soothing and satisfying.' Asked how he knew that, he said: 'Well, I know that it was moving because after the first 10 minutes most of the audience moved out of the room. I know that it was soothing, because after the second 10 minutes the rest of the audience were asleep; and I know that it was satisfying because when I sat down the man opposite me woke up and said, "We have had enough of that damned fellow anyway".' I will therefore conclude by asking you to join with me in drinking the health of the Institute and its Allied Societies, coupled with the name of your President; and in conclusion I should like to say how sincerely I thank you for your hospitality and kindness and for the honour which you have done me in asking me to propose this toast.

The President: When my Council decided that this year we would have a Dinner, I am not quite sure what considerations influenced them, but the records show that the last Dinner which we had was in 1947, five years ago. In the interval we have had to make do, to return the hospitality of our many friends, with receptions. Now, a reception is a very good thing, but it is just not quite a Dinner, and I feel very honoured that they have made the period of my Presidency coincide with a Dinner. I have a feeling that this may be mixed up in some way with me. The Institute have for the first time experimented with a President from Scotland, and they simply had to bang the saxpences, if only as a gesture.

The records also show that at our last Dinner the toast of the Royal Institute was proposed by the then Prime Minister, Mr. Attlee. We are all very sorry that he had at the last minute to say that he could not

be here this evening; I had a note from him this afternoon expressing his regret. If he had been here I had hoped to say to him that the fact that he was no longer Prime Minister but was now Leader of the Opposition in no way diminished the honour which we should have felt conferred on us by his presence.

Tonight this toast has been proposed by the Secretary of State for Scotland who is, with apologies to the Prime Minister, to a Scotsman the most important member of the Government. You will all wish to join with me in thanking him for coming here this evening.

To my English friends it may not perhaps be known that the Secretary of State for Scotland in his own person, with his own two hands and brain, does the work which in England is done by, I understand, anything up to a dozen different Ministers. There must be some inference to be drawn from that, but I leave it to you. As Mr. Stuart, among his many preoccupations, has the interests of architects to look after, he has no need to apologise for coming here and proposing this toast. I am certain that he is fully qualified for the task. Moreover, I deny that any man can be born in Edinburgh and not have some appreciation of architecture. But I am sorry to have to decline, on behalf of Glasgow, the Scott Memorial!

When the President of the Royal Institute stands up to speak, people expect that he will say something about architecture. If I have learnt anything at all recently, I have realised in the last two years that the most dangerous topic for the President of the R.I.B.A. to talk about is architecture. I decline to be drawn on that subject. Architecture has been likened to a mixture of dreams and drains. We shall never all agree about the art of architecture, so that it is not much use starting a row—or is it? I will put it in this way, that if we did all agree about it, architecture would cease to be an art.

When I had just finished my schooling the question of my future arose in the household. My father thought that I should become a lawyer. I do not know whether he regarded the law as the most profitable of the professions. My own idea was to turn to art, but, realising that in a Presbyterian household art was not regarded as being strictly respectable, apart from the question of profit, I decided, with what I thought at the time was some degree of subtlety, to choose architecture, as being the back door, so to speak. I therefore put the question to my father, 'What do architects do?' and I remember very well his answer, 'They mostly starve.' Of course, if you look at us now that may not seem to be true! Or perhaps the difference that he would have noticed today is that we all starve together.

On that twin text of question and answer I propose to hang a few remarks. Take first the question, 'What does an architect do?' I wonder how many of the public today really do know what an architect does? I think it is a very small proportion. I have no time tonight to tell them the answer, but what I should like to emphasise is this, that in my experience I have seen an enormous uplift in the status of the architect. He is almost popular nowadays in certain circles. I think that the position of the architect today is largely due to the Royal Institute of British Architects, which has fostered the education of the architect and built up the profession into an honoured position, but that position can only be assured by the men who practise our profession being thoroughly competent. It is only because of that that we have the right to expect public esteem.

The next point that I want to make is this, and it is a very important one. In my experience I have known a time when perhaps five per cent of the profession were engaged in doing public work, either as officials or otherwise. Private clients provided the remainder. Today more than 50 per cent of qualified architects are employed in official or salaried capacities—we have some of the best architects in the country so employed and I honour them for the excellent work they are doing. It is obvious that in the future more and more architects, including those privately practising, will have to look to the State for their employment. The State has spent an enormous sum of money on educating architects, and if it sharpens the tool it must find some use for it, or it will have wasted its money. It is from that point of view that I appeal for careful consideration to be given to the architect as a planning expert, and for the appreciation of his work.

Then there is the answer to my question, 'They mostly starve.' This gives me an opportunity to refer to the office, which I also hold, of the President of the Architects' Benevolent Society. We have members who have that fear hanging over them, and I take this opportunity—and I do not apologise for doing so—to appeal to all architects to support the Architects' Benevolent Society by a modest donation, but an annual one. There are many deserving cases which come to our notice and our activities are only limited by the money available.

To go back to members of our Institute, over a considerable period of years I have noted that our profession is very liable to periods of excessive activity and subsequent slump. That has occurred repeatedly. In the old days of private enterprise, if private clients fell off we had to make the best of it, but now the State has brought us, by circumstances, to the condition where we can only look to the State for employment. The architect is the first to suffer when there is a slump, and I think that the State should have careful regard to that fact. I can assure you, Mr. Minister, that the Royal Institute of British Architects will do its utmost to co-operate in any proposals which may assist the employment of architects. We cannot ourselves create employment for architects; that is self-evident.

I want to thank very sincerely the Secretary of State for Scotland for proposing this toast in such generous terms. This has rather the flavour of a Scottish night, but I do not want you to run away with the idea that it is entirely due to my influence. It is due—and I close on this note—to the very great kindness which I have received from all my friends on both sides of the Border. I hope that to some small degree I have been able to cement the cracks in our common Stone of Destiny.

Mr. H. S. Goodhart-Rendel, Mus.B. (Cantab.), M.A. (Oxon), Past-President R.I.B.A., who proposed the toast of the Guests, said: I was once told that the secret of proposing acceptably the toast of the Guests was to have a clear notion in one's head as to why they had been asked, and also a clear notion in one's head as to why they had accepted the invitation. I think that the first notion must be clear in the minds of everybody. The Royal Institute of British Architects has obviously asked those whose presence will do it most honour and whose company will be most pleasant. But why has this honour been done to us and this pleasure bestowed? A great many learned societies and professional bodies are constantly clamouring for the attention of important people, and we like to think, in compliment both to them and to ourselves, that many of our guests have chosen to accept ours from among many invitations, and that they have done this as a tribute to architecture—not necessarily to architecture as it is now, or even to architecture as it has been at any particular period, but to architecture as an art in which every civilised nation must strive to be eminent.

We all acknowledge that necessity, but I am not sure that any of us can claim to have a constant, unclouded mental vision of the nature of the art that it is our profession to promote. Man is obliged to build himself shelter, but he can do so by the exercise of mere constructive skill. What he so produces he is apt to call architecture, misusing that word and debasing its meaning. There ought to be a vaguer word for him to use in its stead—a word like 'clothing', which suggests to us not very nice clothes, or 'housing', which suggests to us—well, at any rate, houses.

Now, architects earn their bread by contriving human shelter. I have no doubt that if they did no more, those of our guests whose especial responsibility is the material welfare of the nation might still have thought us worth a visit. On the other hand, we could hardly have been surprised if the President of the Royal Academy had found himself otherwise engaged; and I suspect that the Presidents of the engineering societies, considering that we claimed only to do what they thought they could do quite well without us, would have decided to leave us to it.

This is not the time to attempt any exact definition of architecture, but it is the time all the time nowadays to reiterate its position as a fine art. I really ought not to say 'its' position but 'her' position, the position of what a leading member of our Institute and of the Royal Academy used constantly and rather embarrassingly to proclaim his 'mistress art'.

At the present time, architecture finds herself expected to behave less as a mistress in any sense than as a general servant, with a number of useful tasks to perform under employers who expect her only to be clean, willing and moderately sober! Her power of performing those tasks not only efficiently but beautifully is unimagined by many for whom she works, and I am afraid that it is sometimes forgotten by herself.

Utensils made of enduring material are almost sure to survive their first usefulness, since needs change and forms become obsolete more quickly than wood and metal, cement and broken stone and glass can decay. A thing which has survived the use for which it has been made can be as permanently delightful as a beautiful link holder or a pair of beautiful candle snuffers, or as superfluous and undesirable as one's departed uncle's false teeth. Probably many of the buildings which we put up today will continue obstinately to exist at a time when it will be as hard to find a satisfactory use for them as it is now for the many treasured buildings whose first destination is spent. We want to keep those older buildings because we realise that they are useful still in a sense far deeper than physical, that they can give to our sons and grandsons an enrichment of the spirit far more valuable than the material convenience to which in a moment of carelessness they might be sacrificed.

We can all have our own opinion on how much the spirit of our great-grandsons will be enriched by the historic buildings that the more enduring of our present constructions will then have become. Everything will have passed from them then except their architecture. Their novelty will have gone; their particular serviceability will have disappeared and their youthful good health will have vanished; they will exist only on their architectural quality. If their architecture is good and true, men will love them and be the better for loving them; they will try to find some use for them, and resist destroying them just as we try to resist destroying old manor houses. Can we hope that that will be so? Let us hope that it may be so, so that we may do something to repay to future generations what we owe to the last.

I believe that the answer to the second question with which I began this speech lies very near to this point. I believe that our guests have come tonight because we stand, however unworthily, for the fine art of architecture. I believe that our guests know, as we know, that in the long run the exercise and appreciation of the fine arts are even more necessary to human improvement than are the proper cares of the body, with which we seem chiefly to be occupied at the moment.

I have no reason to suppose that any of our guests suspects us of making art an expensive extra on the bill, but the suspicion is one which architects do so often encounter that it is likely to be in the minds of some who are otherwise completely sympathetic with us. Of course architectural art is an extra, but not an extra on the bill; it is a further expenditure of skill, not of money, an expenditure of skill in giving spiritual significance to what may have already been made skilfully enough to serve its merely physical purpose. It is the source of the pleasure which we take in looking at buildings with which we have no personal concern, at the temples of other men's faiths, the places of other men's occupations, the houses of strangers. It is the elimination of accident, the imposition of design, of order, which, as experience shows, are more likely to take something off the bill than to add anything on to it.

Those who were present recently when Her Majesty's Minister of Works told the Council of the Institute, in an informal address, how we could best help him in this time of emergency, will preserve the happiest memories of that occasion. Never has a collaboration been more auspiciously initiated. We all felt then that the emergency was no menace to our art but rather a challenge to our resourcefulness. While not concealing from us the inevitable limitation of our opportunities, he suggested that such opportunities as we had were exceptionally stimulating—stimulants of original thought, jolts out of the rut.

One of the jolts which I think quite particularly salutary is the shortage of steel, a material of which the legitimate uses are many, but of which far the most popular use, that of saving the architect trouble, can have little defence. In the schools, many students expect it to behave like the shoemaker's elves in Grimm's fairy tale, and to do all their work for them while they sleep. Personally, I am extremely glad that so many of us are having to give up steel this Lent!

I see less than I used to of the work of the architectural schools, but from what I hear I believe that, among the innumerable things that they spend their time planning, buildings tend to be increasingly included!

We have with us tonight not only Her Majesty's Minister of Education but others whose achievements in that field are famous. To them we stand in a position of double responsibility. We have to design, for them, buildings that will comply as closely as may be with elaborate and constantly changing requirements, and we are charged ourselves with the education as architects of that enormously long queue of hopeful young people standing before the door of our profession. We think we can promise that, when the time comes for us to loose those young people on the professional world, they will have had most of the infectious diseases which are best got over in youth and will be more than worthy successors to the elders they will displace. We hope also that the time for executing the designs which we are now making for school buildings may come soon enough for those designs to retain other values beside the historical.

The work of the architect, like that of the musician, can be set out exactly on paper but comes fully into being only when performed by other hands than his. The architect without the building tradesmen and their immediate employers, the building contractors, is as dumb as an orchestral composer without an orchestra. We rejoice to have the leaders of the building orchestra among our guests tonight. The tie between them and us, always close, has never been closer than it is now made by common adversity. Another most welcome guest represents the chartered surveyors, most generous men who know everything about us and the builders and yet do not shun our company.

In these few remarks, preliminary to the toast which I am to propose, I have spoken of topics and of offices which people hold rather than naming people, because you have all seen the table lists and know already how distinguished is our company. You have seen that we have with us men eminent in every branch of public service, and that India, South Africa and Scotland are represented in a most distinguished way. We are truly grateful to all our guests for honouring our entertainment, and we hope that with all of them we have made or strengthened a friendship which our common interests will make more and more valuable in the future.

The Right Hon. Lord Macmillan, G.C.V.O., LL.D. [*Hon. F*] said: After the most generous and delightful hospitality which your guests have enjoyed this evening, I am happy that my task is to respond for them and not to answer for them.

My personal position is both ambiguous and intimidating. It is ambiguous because, after all, am I not a Fellow of the Royal Institute of British Architects? Honorary, no doubt; heaven help the building owner who asked me to design a house for him! I count it, however, one of the most delightful honours that has ever fallen to me, and I am still at a loss to know why it was ever bestowed on me. Possibly the reason may be the work which has been done by a body of which I have the honour to be Chairman, namely, the Pilgrim Trust, which has had the happy fate of being able to do so much to preserve many of our most beautiful architectural possessions in this country. That great Italian cynic, Machiavelli, in his book *The Prince* says: 'The giving away of that which is another's does not detract from thy reputation but rather adds to it.' Hence my reputation, a reputation very easily earned by a Scotsman.

I can well understand how others have received this distinguished honour, such as my neighbour on my left (the Duke of Wellington), whose connoisseurship in all matters of art we honour and admire. I can understand how you came to make an Honorary Fellow of Mr. Winston Churchill, who is so expert in laying but never dropping bricks. I suppose that Mr. Attlee, whose absence we deplore, may possibly have some architectural reputation at bridge building at the present moment.

I leave aside the ambiguity in my position, however, as being almost a host, and assume for the moment the pleasant attitude of being a guest, and of speaking for the very distinguished company of guests for whom I am to reply. In doing so, I labour under several rather grave disadvantages. First of all, I am a lawyer. I think it was

Disraeli who said that the legal mind chiefly consists in illustrating the obvious, explaining the self-evident and expatiating on the commonplace. Tonight, as usual in the rôle of an after-dinner speaker, I suppose that I should expatiate on and illustrate the obvious and the self-evident. I should certainly do so if I were to dwell at any length on the pleasure which we have had in being your guests, because nothing could be more evident and obvious than our delight in your hospitality.

The other drawback under which I labour, and which I share with your President, is that of being a Scotsman. We are a very literal and a very laconic race. Perhaps I can best illustrate that, as one always does, by a short anecdote. A kindly English tourist arrived at a Highland village and in the morning went for a stroll. The first thing that he came to was the village churchyard. That is a form of attraction which we provide in Scotland for tourists. He leant over the wall and observed a gravedigger at his melancholy task, and he said to him, 'Things are quiet here, I suppose?' The gravedigger pointed to the grave and replied, 'Not so quiet as they are there.' 'No doubt,' said the tourist, 'but I suppose people do not die often here?' 'Only once,' said the gravedigger. The Englishman, not disconcerted, returned to the charge and remarked, 'Have you spent all your life here?' 'Not yet,' was the reply. That is an example of the qualities of literalness and laconicism to which I have referred, but with a Scotsman in the chair and the Secretary of State for Scotland addressing us, as he has done, so delightfully, I think that any Scotsman will for the moment cease to be either laconic or literal and become thoroughly enthusiastic in his response.

The real task, of course, which I ought to perform is that of praising and thanking our hosts. The art of architecture has one quality which raises it above all others, and that is its permanence. That places a much greater responsibility on the architect than upon the practitioner of almost any other art, because his works do follow him. The lawyer makes his speech and has his little say and everyone forgets him, though a few names linger in the public memory. The works of the pictorial artist have a longer life, but they have none of the permanence of the great monuments of architectural skill. The work of the actor does not outlive him. I could go through all the professions, and the achievements of none have that quality of permanence which places such a special responsibility on the architect.

We are still able to admire the Acropolis of Athens and the great works of architecture of the past, not only in Italy but all over the world—beautiful palaces in France, the Taj Mahal in India, and other great works which through the ages testify to the skill of the great architects of the past and form an inspiration to the architects of the present day. In that quality of permanence I think that you, Mr. President, and the artists you represent enjoy a very special privilege.

If I pursue this topic at much greater length, however, I am afraid that my speech will seem to have the qualities of a prefabricated structure. My remarks are spontaneous and not prefabricated, but I suppose that nowadays a functional speech is what you expect from me. I dislike the word 'functional' but I find that almost every work of architecture nowadays is described as a remarkable piece of functional work. If we use 'functional' in its proper technical sense, as meaning that buildings should be designed for their purpose, then functional architecture is a great and worthy thing. It is a marvellous privilege to be able to combine in your work the pursuit of two things, beauty and use. So many things of beauty are not useful and so many useful things are not beautiful, but every great work of architecture is both beautiful and useful, and therefore in your task of providing for our needs in housing our people and our great institutions and at the same time making those buildings beautiful you are performing a very noble function.

There are various forms of after-dinner speech; there is the premeditated speech, the rhetorical speech and so on. There is, however, one genre which I have always found to be immensely popular, especially towards the close of the evening, and that is finished oratory. So I conclude by expressing the warm thanks of your guests.

Correspondence

OLD BUILDING MAINTENANCE PROBLEM

Sir,—I have a problem which may become increasingly common in the future, and the answer to which, if there is one, should be of general interest to members concerned with the maintenance of old buildings. I have to preserve a house which has been scheduled as one of 'Special Architectural or Historical Interest', under Section 30 of the Town and Country Planning Act, 1947.

The facing bricks are purpose made 2 in. bricks, with a fairly hard surface, but very under-burnt internally, and have weathered exceedingly badly. One chimney stack has already had to be taken down and rebuilt, and large areas of the general surfaces are deeply pitted. A resident in the house tells me that he can, from time to time, see bricks which have newly begun to deteriorate. In the past some of the cavities have been filled with a coloured rendering, lined out to imitate the brickwork. Most of this has now blown off and more is ready to fall.

I have considered the possibility of applying a silicate solution to the brickwork, but I am satisfied that this could only result in a further hardening of the surface, which would then spall off as before.

I have consulted the Building Research Station and the Ancient Monuments Inspectorate of the Ministry of Works, and they have been able to suggest only the refacing of the decayed areas either in brick or in briquettes. As, however, even apparently sound bricks are continually beginning to decay, and this process might be accelerated by the presence of less porous areas, the whole building would probably need to be refaced in due course, at a cost quite beyond my client's means.

The only course which appears to me to be practicable is to render the building, but as this would entirely change its character I am loth to recommend it to my client if anything else is possible.

Has any member any suggestions to offer?

Yours faithfully,

JOHN E. STUPPLES [*A*]

SUPERANNUATION SCHEME

Sir,—The notes outlining the Superannuation Scheme in the January issue were extremely interesting to me as I had for some years been privately urging that this would be of considerable value in private practice. It is satisfactory that the hint contained in paragraph 52 of the Report of the Committee to Consider the Present and Future of Private Architectural Practice should have been followed up, and it may come as news to members of the R.I.B.A. in England to learn that the Royal Incorporation of Architects in Scotland have approved an independent Pension Fund and Life Assurance Scheme. It is perhaps typical of the lack of real interest in matters concerning the welfare of those in private practice, both principals and assistants, that I understand the majority have not so far bothered to return the cards which were distributed with the JOURNAL. This is by no means the first time that response to an appeal for information has been so badly supported.

Possibly those affected might have shown more interest if they had had the opportunity which I, through the courtesy of the Secretary of the R.I.A.S., have had of studying the benefits in some detail. The figures as set out in the booklet indicate the very considerable returns as pensions which are payable in return for small contributions. It is to be hoped that those who have not yet returned the cards will give the matter further thought, as through the adoption of such a scheme the private practitioner may reduce the drift of assistants into the superannuable security of official offices and the assistants who prefer the freedom and variety of private work may not in late life be penalised for their choice.

There are many obscure points both in the outline of the R.I.B.A. proposals and in those of the R.I.A.S. which one would like to see clarified, but presumably the Committee dealing with the subject will in due time set out in detail the conditions, if members can be persuaded into letting their wishes be known. I feel that until some decision is reached it would be pointless for me to list any of the queries which have occurred to me and which will no doubt occur to others.

Yours faithfully,

A. A. MACFARLANE, A.M.T.P.I. [*A*]

Review of Construction and Materials

This section gives technical and general information. The following bodies deal with specialised branches of research and will willingly answer inquiries.

The Director, The Building Research Station, Garston, near Watford, Herts.
Telephone: Garston 2246.

The Officer-in-charge, The Building Research Station Scottish Laboratory, Thorntonhall, near Glasgow.
Telephone: Busby 1171.

The Director, The Forest Products Research Laboratory, Princes Risborough, Bucks.
Telephone: Princes Risborough 101.

The Director, The British Standards Institution, 28 *Victoria Street, Westminster, S.W.*1.
Telephone: Abbey 3333.

The Director, The Building Centre, 26 *Store Street, Tottenham Court Road, London, W.C.*1.
Telephone: Museum 5400 (10 *lines*).

The Director, The Scottish Building Centre, 425-7 *Sauchiehall Street, Glasgow,* C.2.
Telephone: Douglas 0372.

Fire Protection of Churches. The Fire Protection Association have added to their series of useful technical booklets a new one covering churches. Although one would think there is not much to burn in the average church, fires in them are by no means rare occurrences; in addition to accidental outbreaks, there are not infrequently fires started deliberately by fanatics. Fuel is provided, in both cases, by organs, chairs and tapestries and, oddly enough, by accumulations of rubbish introduced by birds in their nesting operations into towers, turrets and roof spaces. Outbreaks may remain undetected for some time, and once a fire has reached a timber roof it presents a specially difficult problem to firemen because of its height above ground, inaccessibility and free supply of air. As regards accidental outbreaks, heating and lighting systems have caused many fires, and the booklet makes some useful suggestions on the design of these. To meet the problem of roof fires the installation of a dry riser is recommended. Copies are obtainable from the Fire Protection Association, 84 Queen Street, E.C.4.

Fire Retardant Paint. It is somewhat strange that a good deal of thought is given to the choice of tints for the decoration of the internal surface linings of a building but very little to the prevention of the spread of flame along the material if a fire should occur. British Standard 476 : 1932, and an amendment of 1945, deal with definitions of fire-resistance of building materials, including methods of test, and the JOURNAL has received a report of a paint subjected to the spread of flame test. The paint is called T.K.S. Firecheck, and the test was carried out by the D.S.I.R. and Fire Officers' Committee Joint Fire Research Organisation, two coats being applied to specimens of fibre insulating board; the amount of paint being proportional to an application of one gallon to every 30 sq. yd. for each coat. Untreated, such boards would be placed in Class 4 category, 'Surfaces of rapid flame spread', but the test showed that the treatment raised them to Class 1, 'Surfaces of very low flame spread', that is, surfaces on which not more than 6 in. mean spread occurs. T.K.S. Firecheck paint is manufactured by Messrs. Turner, King and Shephard Ltd. of 82 Victoria Street, London, S.W.1, who also supply a special Firecheck sealer if further decoration is desired.

The Care of Baths. Most persons no doubt think that a porcelain enamelled bath, once installed, will need no further attention except a rinse after use and a more thorough cleansing at odd intervals. And as to bath salts, well—women just throw them in. But these apparently simple operations can be wrongly done, and the British Bath Manufacturers' Association have published some timely and useful instructions on the care of baths. Their folder is meant for builders and plumbers, while their leaflet is intended to guide householders and tenants.

Among the recommendations given in the leaflet are these: cleaning should always be done while the bath is still warm; cleansers of a gritty or abrasive nature should be avoided; bath salts should be added while the bath is filling; lemons and preparations of an acid or strongly alkaline nature should not be allowed to come in contact with the enamelled surface. Anyone wishing to have copies of the folder or leaflet should write to the Association, either at 145 St. Vincent Street, Glasgow, C.2, or 30 St. James's Square, London, S.W.1.

The Care of Gas Cookers. The Gas Council have published a booklet entitled *Common Sense Use and Care of your Cooker*, and it can be had free from the Council at 1 Grosvenor Place, London, S.W.1. It is not easy tactfully to give advice to the cook, who in most cases is one's wife these days, but one little hint in the booklet might be passed on and should result in a lessening of the gas bill. 'Never let the gas flare up around saucepans. For example, if you want to bring a kettle or pressure cooker to the boil quickly, simply turn up the gas until the tip of the flame just touches the bottom of the utensil.' That, at least, is a tip worth noting.

Boiler Scale. Although catering equipment is usually provided by specialist firms, the architect is concerned with the supply of water to the boilers and not infrequently with the maintenance of the equipment. It may therefore be of interest to note an exhibit at the recent Hotel, Restaurant and Catering Exhibition at Olympia which is designed to prevent the formation of scale in boilers. It is called the Filson and prevents scale formation by electrical means instead of by chemicals. In a descriptive pamphlet it is stated that mains water usually contains an appreciable quantity of solid matter in the form of a colloid, and this has a material effect on whether the scale, when it crystallises out of the water, takes the form of a hard incrustation or a finely dispersed sludge. Hard scale incrustation takes place when large crystals and agglomerates form, but if this is prevented by providing a number of centres of crystallisation, then a finely divided sludge is formed which passes through the water system. The Filson effects this by electrical means, and the apparatus is connected to the electrical supply on one side, and on the other is inserted into the water supply by means of a tee in the pipe. After that no attention is required, and the suspended scale passes through with the water. The Filson was exhibited on the stand of Messrs. W. N. Froy and Sons, Ltd., and is made by Messrs. Filson, Ltd., of 87a Upper Richmond Road, London, S.W.15.

Acustica. This is the title of a new journal dealing with all aspects of acoustics, and as it is desired to give the venture an international character it is being sponsored by the English Acoustics Group of the Physical Society, the French Groupement des Acousticiens de Langue Française, and the German Verband der Deutschen Physikalischen Gesellschaften. Parts 1 and 2 of Volume I, 1951, have been published, with Part 1 of a supplement. Each of these organisations has appointed an editor; in England that position is held by Dr. E. G. Richardson, of the Physics Department, King's College, University of Durham, Newcastle-upon-Tyne, 1, to whom English manuscripts should be sent. The journal is published by S. Hirzel Verlag, Claridenhof, Gotthardstrasse 6, Zürich, from whom it may be obtained, either direct or through booksellers, but not through the editors. There will be six numbers a year, the subscription being 36 Swiss francs per volume, or the equivalent in other currencies.

Codes of Practice recently Published. CP. 131.101 (1951). *Flues for domestic appliances burning solid fuel.* Contents: materials, appliances, components; design considerations regarding chimneys in brick, stonemasonry, concrete, precast concrete units, hollow blocks and metal and asbestos-cement flues. Fire hazard, damp penetration, condensation. Diagrams of fireplace recess and throat; height of chimneys above roofs in relation to fire hazard; wind pressure and suction zones; connection between appliance and flue; distances of combustible material from flue pipes passing through roof; sound insulation, and damp-proofing. Price 5*s.*, post free.

Italian Contemporary Architecture

Opening of the Exhibition at the R.I.B.A., 21 March 1952

Display in the glassware gallery at the IX Triennale Exhibition, Milan (1951). Architect: Roberto Menghi

The President said first how disappointed everyone was that His Excellency the Italian Ambassador, so recently arrived in this country, was unable to be present, having had to return to Italy suddenly owing to the serious illness of his father-in-law. Had he been able to open the exhibition as arranged, it would have been his first function since taking up his duties in London. The President extended a welcome, however, to Signor Livio Theodoli, the Chargé d'Affairs, who had so kindly come in the place of the Ambassador, His Excellency Signor Manlio Brosio.

The President then introduced Mr. Ernesto Rogers who, as most of his audience would know, said the President, was a member of C.I.A.M. and a partner in a firm of architects in Milan, and had been much concerned with the preparation of the exhibition, which was sponsored by the Italian Institute and organised by the Italian group of C.I.A.M. After being shown here the exhibition was to visit a number of centres in Britain before going on tour on the Continent.

The President drew the audience's attention to the handbook of the exhibition, also prepared by the Italian Institute, and containing an article by Mr. Robert Furneaux Jordan and one by Signor Giulio Carlo Argan.

Signor Theodoli said he wished first to express the Ambassador's regret at not being able to open the exhibition, a regret which was particularly strong since he was greatly interested in the development of Anglo-Italian relations both in the cultural and artistic fields. It would have been, as the President had said, his first official function in London. Signor Theodoli then read the Ambassador's speech: 'You have in this country a great interest in and great knowledge of both classical and modern Italian art. You have at the moment at the Royal Academy a very interesting exhibition of the drawings of Leonardo, who was, as you know, one of the greatest artists and one of the greatest architects. He was in fact a very modern architect—so modern that many of his ideas were never understood and never executed. But the exhibition which you will now see is a modern exhibition of works which have been executed. I think it is the first of its kind in London, and its aim is to give the British public—including that part of it not specifically interested in the technical problems of architecture—a better idea of the artistic trends in modern Italian architecture.

'As you know, architecture is an art which in its scope is very close to the social life of a people. Thus, in this exhibition you will observe something above and beyond a mere succession of styles and trends. You will observe that these styles and these trends reflect the historical and social changes of my country. Neither will it escape your notice how the currents of thoughts and ideas in Italy since the war are closely linked with the most vital developments of modern architecture.

'Some elements during the later years ignored, for political reasons, these developments, so that in many public buildings and monuments could be seen a return to former styles which recalled the classical forms but which in reality were neither vital nor sincere. But all this belongs to the past, and Italian architects are now imbued with a new spirit and new ideas, as you will see in this exhibition, which I have very great pleasure in declaring open.'

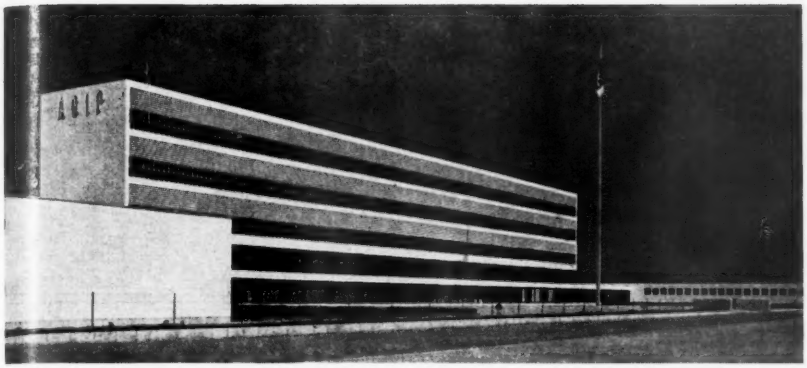
Mr. Ernesto Rogers said he was here in his capacity as an Italian architect, but that others far worthier than he should really be in his place. He particularly wished to mention his colleagues Albini and Peressutti, the two delegates from the Italian group of C.I.A.M., who were concerned with the organisation of the exhibition. It was, he said, a Herculean task to organise 70 odd architects, to extract a response to countless preliminary letters and get hold of photographs, biographies, etc. It was the weakness of architects that they were in love—in love with architecture, a capricious mistress who always evaded capture. It was therefore much to the credit of Albini and Peressutti that the exhibition was actually here in spite of those 70 architects, and in spite, too, of customs barriers, bureaucracies and all the other Philistines who still divided Europe up by fictitious frontiers.

As well as the two delegates already mentioned, Mr. Rogers said he must thank a number of students, especially Giotto Stoppino and Toni Bonfante, who had helped in the realisation of the project of the exhibition. But above all he must thank those individuals and bodies here in London who had given support, despite the fact that they must have asked themselves right up to the last moment, 'Will those blessed panels arrive or not?' 'Thanks too,' Mr. Rogers said, 'to the Council and officials of this noble house of British architects where we are privileged to receive hospitality, to the Italian Institute which considered us worthy to represent our country's architects, and to Mr. Robert Furneaux Jordan who, while he was still Principal of the Architectural Association School of Architecture, first had the idea of this exhibition.' And, finally, Mr. Rogers said, he must thank the many young London friends who had received the material like—as it were—the flickering of an Olympic torch—and had striven so generously for the past two nights to arrange it. So that here it was, actually ready today—the first day of spring!

Mr. Rogers said the aim of the exhibition was to give an opportunity of apprehending, by means of a rapid synthesis, about 30 years of Italian architecture—the first part of which 30 years' work had been completed in the shade of political conditions which he hoped he might be allowed to pass over in silence. If the purpose of the exhibition was to represent the struggle to create a human architecture for living man, then the choice of the organisers could not be indiscriminate. Since it was desired that the work shown should also be free from all formalism or dogmatic preconceptions, and restricted to those works which had truly resolved, or attempted to resolve, architecture's problems, then it was clear that there was no room for many manifestations which had taken shape in cement and brick during this period.

He went on to say that most of the architects here were descendants of William Morris, and had taken to heart the lesson in modesty handed on to us by his disciple Lethaby when he exhorted members of the Arts and Crafts in these words: 'We must begin humbly by cleaning the streets, by washing and whitening the homes, taking care that a railing is a beautiful railing and a lamp a beautiful lamp.'

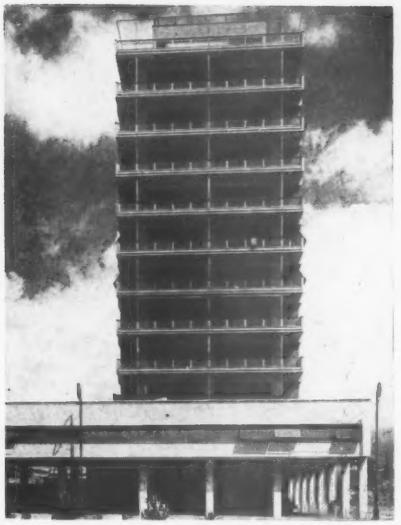
The exhibition, he said, contained works by artists, the oldest of whom were still young, so that rather than offering results it suggested problems. The audience would judge if the statement of the problems convinced them. Did Italian architects, he asked, know how to live freely, to serve their fellow citizens both as individuals and as a collective organism? On the other hand, could they find a place for their work in the great cathedral of contemporary history? Were they worthy of recognition among the architects of the world? It would give him great pleasure, Mr. Rogers



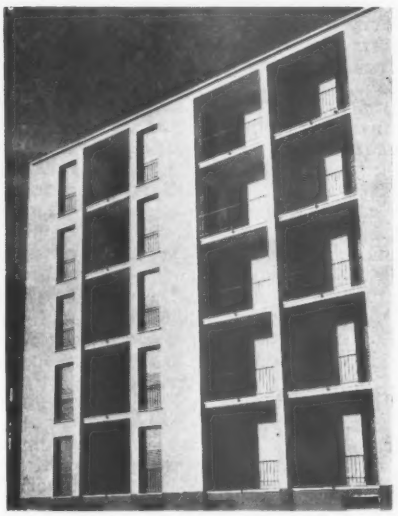
Vacation building for children at Cesenatico (1937). Architect: Guiseppe Vaccaro

Flats on the Via Salaria, Rome (1951). Architect: Vincenzo Monaco

The Rinascente Department Store, Milan (1950-51). Architect: Carlo Pagani



Flats in Genoa (1940). Architect: Carlo Daneri



Workers' flats in Testro San Giovanni, Milan (1950-51). Architect: Giancarlo de Carlo

said, to be able to look into the hearts of the visitors to the exhibition and know what were their genuine reactions.

At any rate, he said, it was gratifying to know that now many foreigners—artists, students, architects, even tourists—did not go to Italy only to admire monuments of the past, but also to look at more recent work, done within the present generation.

What foreigners most appreciated, he thought, in Italian architecture today, was the completeness of its range. In fact, he said there were few modern Italian architects who did not feel that, in facing the problems of a glass, a chair, a dwelling or an entire city, they were starting from the same premises and aiming at comparable ends. The Italian's very vitality, and his humanism, in which consisted largely his attraction for other races, could lead to uncontrolled improvisation, and to a superficiality. In some spheres it sometimes led him to confuse liberty with licence. These characteristics of the Italian temperament found direct expression in architecture.

The 65 panels which make up the exhibition formed, said Mr. Rogers, a representative sample of contemporary Italian architecture; though it was not to be thought that, by travelling in the peninsula, one could see at every turn what one could see at the exhibition. In Italy, as elsewhere, living architecture was a current which moved forward in spite of the many, in spite of the over-timorous and those who are content to turn out quantity without bothering about quality.

But his audience would know, said Mr. Rogers, how to arrive at a balanced view by grasping the positive values in the work submitted here to their judgment. Those same values appeared in ever more numerous examples of modern English architecture—often, in his opinion, a happy complement to the Italian— and visitors to the exhibition would appreciate not only the likeness but also the differences between the independent national and individual cultures of England and Italy.

'Since to know how to enjoy the infinite diversity of human thought and its creations means,' said Mr. Rogers, 'loving liberty itself, in each individual instance, there is no country more capable than yours of understanding and defending those principles.' He concluded: 'I only hope that you will want to reply to this somewhat rash gesture of ours by sending us an exhibition of contemporary English architecture.

Mr. R. E. Enthoven [*F*], **Vice-President, R.I.B.A.**, moving the vote of thanks, said: May I say on behalf of all those present and of the R.I.B.A. how grateful we are to the Chargé d'Affaires for coming here today on behalf of the Ambassador to open this Exhibition. We have always been glad of our close contact with the Italian Embassy; we have had many visits from the late Ambassador and we hope we shall see his successor as often.

Secondly, I have to thank Mr. Ernesto Rogers, whose name does something to express the link between Italy and Britain. He is well known to many of us as an architect of note, sometime editor of DOMUS, guest lecturer at the Architectural Association School, lecturer and writer; and he has worked very hard to prepare this exhibition, with the help of his assistants. As you will see, it stands on its own merit in the gallery, needing no decking out with elaborate display to distract attention from its contents.

Building on Shrinkable Clays

Some Applications of Short Concrete Piles

By H. Green, A.M.I.Mech.E.

IN THE NOVEMBER 1949 issue of the JOURNAL Dr. N. Davey, of the Building Research Station, contributed an article on short concrete piles for foundations on shrinkable clays. Since then, this type of foundation has been applied to an increasing number and variety of buildings ranging from a single-storey laboratory to terrace houses and schools. In some cases the design has been formulated in collaboration with the Building Research Station, whilst in others the information given in the article has been used as a basis, modifications being made according to personal experience and judgment. There has been a tendency, as is usual when using a new technique, for designs to be somewhat conservative; more or bigger piles and, more especially, deeper and stronger beams than are probably necessary being specified.

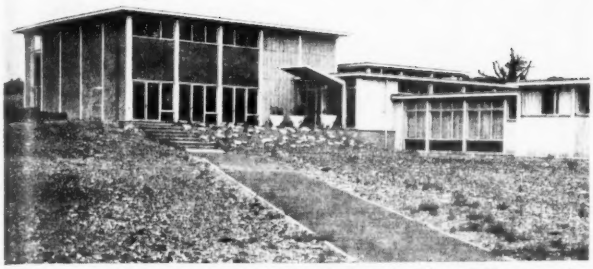
The variety of buildings erected indicates that little or no restriction of elevation is imposed by the use of piles; neither does the type of building, apart from weight considerations, appear to be restricted. This type of foundation has also been used in the re-erection of buildings which have cracked owing to previous foundation failures, and one local authority has used bored piles for underpinning at, it is stated, considerable saving in cost over traditional methods, where foundation failures have taken place because of clay shrinkage.

The largest group of houses and flats on short bored piles which has so far been erected is probably that forming part of the Biggins Wood housing site of the Folkestone Borough Council. This scheme has been carried out in three stages; first, seventy houses in blocks of two, four and six, followed by forty two-storey flats in blocks of two, and a further forty houses. On this site, where soft yellow clay overlies gault clay, wet weather had made it impossible to proceed with strip footings owing to the flooding and collapse of trenches. The decision was made to try bored pile foundations, and these proved to be satisfactory. The soft clay necessitated a close spacing of piles, 5 ft. maximum centres, but in spite of the large number of piles used it is stated that a saving in cost has been made compared with the deep strip foundations provided previously. The soil proved to be suited to hand boring, and all the holes, 12 in. and 14 in. diameter, have been bored by hand. A terrace of six houses on short concrete piles on the Biggins Wood site is shown in Fig. 1.

Fig. 1: Terrace houses at Folkestone: Folkestone Borough Council

Fig. 2: Detached house at Welwyn Garden City: Architects' Co-operative Partnership

At the Queen Edith's Way site of the Cambridge City Council a first batch of twenty-three pairs of semi-detached houses with shells of poured concrete has been erected on short bored piles. For these houses a total of 391 piles, each 16 in. diameter by an average length of 8 ft., were installed. The soil consists of soft chalky clay to a depth varying from 7 ft. to 10 ft. 6 in. with an underlying layer of harder material. The bearing strength of the clay around the shaft of the pile was not expected to be high, and each hole was therefore bored down to the hard layer which provides good end bearing for the pile. Weather and site conditions being favourable and the site organisation very efficient, the whole of the piles were bored and cast in 45¾ hours gross working time.



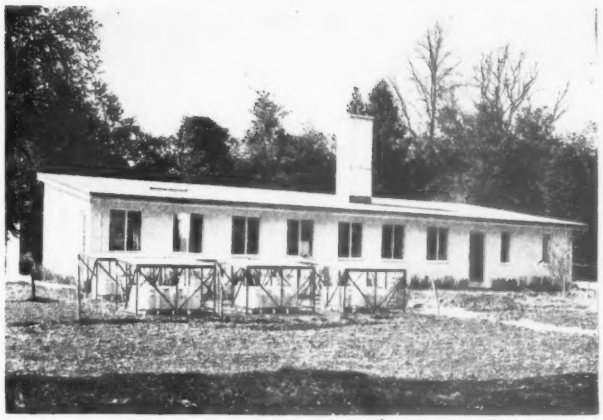


Fig. 3 (above) infants' school at East Barnet: Architects' Co-operative Partnership in collaboration with C. H. Aslin, C.B.E. [*F*]. Fig. 4 (right) apiary laboratory, Rothamsted: Architect, J. B. F. Cowper [*F*]. Designed by Miss A. Towns

On the fifth and final day of the job piles were being made at the rate of 6.43 minutes each. The boring was carried out by a mechanical auger and concrete was transported from a central mixing plant in lorries provided with hoppers which discharged concrete directly into the bored holes within 1½ minutes of completion of boring. Thus, although the ground water level was 18 to 24 in. below ground level, no trouble was experienced from water in the holes.

Fig. 2 shows one of a number of detached houses on bored piles in Welwyn Garden City. In the case of some of these houses it is doubtful whether trouble could be expected from clay shrinkage, although damage from this cause has taken place in parts of this area. However, early experience in this district indicated that hand-bored pile foundations were less costly than traditional foundations, and piles were adopted for this reason in these instances.

The school illustrated in Fig. 3 is one of five on short bored piles completed or in course of erection for the Hertfordshire County Council. The schools are of steel frame construction, and the foundation comprises a pile under each stanchion, except that where the stanchion load is greater than the safe bearing capacity of a single pile, as in some two-storey blocks, groups of two or three piles have been used per stanchion. Almost all the holes for these schools have been bored by machine, and in some cases, where holes were required to be deeper than the reach of the machine, they have been extended by hand. The field investigations, which were carried out in collaboration with the Hertfordshire County Council, indicated where future economies in concrete and labour costs may be made.

An apiary laboratory of lightweight construction with walls of hollow concrete blocks is shown in Fig. 4. An interesting requirement of the building was that there should be no crack or aperture through which a bee could pass. It was, therefore, decided to found the building on short piles. The holes for the forty-six 12 in. diameter piles for the foundation were bored by a machine in one normal working day.

Short bored pile foundations were used for a steel-framed school for Essex County Council in 1947, and for a school with brick walls now under construction for Cambridge City Council. In the latter case the wall loads are transferred to the piles by means of reinforced concrete beams.

Several forms of house, detached, semi-detached, and terraced, and bungalows, have been erected on short bored piles by individuals or local authorities in various districts where the shrinkable clay is likely to cause trouble. They include Stanmore, Pinner, Barnet, Boreham Wood, Welwyn Garden City, Folkestone, Pitsea, Cambridge and Coventry.

In addition to the flats at Folkestone a block of eleven Old People's flats has been built on the Maypole Estate of the Ilford Borough Council. It was estimated that the foundations for these were completed, using a mechanical auger, in two weeks' less time than would have been required for strip footings. One of the advantages of the pile foundation was emphasised here, as work was held up for some time on an adjoining site owing to flooding and collapse of deep trenches for house footings.

In general, hand boring is used where the ground is reasonably free from stones and when the number of holes required is small, as for a house. The mechanical auger is generally preferable on large sites, especially if there are many stones present in the clay. Hand augers 10 in., 12 in. and 14 in. diameter, and machine augers 12 in., 14 in. and 16 in. diameter have been used; in one instance of exceptional loading a 20 in. diameter auger was used for several piles.

The opinion of engineers, architects, builders and foremen who have had experience of the short bored pile foundation is generally favourable, and the following are some of the advantages of this foundation which have been put forward. Foremen, in particular, are pleased at the comparative cleanliness of the site that results from the reduced amount of spoil, and also because the speed at which the foundation work is carried out, especially with the mechanical auger, permits an early transference of unskilled labour to other jobs. Speedy completion of the foundation reduces the risk of a hold-up caused by bad weather and also offers the opportunity of earlier occupancy, to the benefit of owner and tenant. Savings are made in the amount of concrete used and in the cost of spreading or carting away spoil. In districts remote from a supply of unskilled labour the mechanical auger, which reduces considerably the amount of such labour required, is a distinct asset.

Work may proceed on pile foundations when it would be impossible with trenches or excavations for pads, but there have been two occasions on which a machine has been for a time unable to overcome ground conditions in extremely bad weather owing to 'bogging down'; it is possible that with improved machine design such a hold-up could be avoided.

A true comparison of costs between short bored piles and a traditional foundation which would offer equal protection against settlement caused by clay shrinkage is difficult to obtain from individual cases, because it is practically impossible to have the two systems available under identical buildings on identical sites having equivalent labour organisation, under identical weather conditions. There is also some risk in comparing a traditional technique with a technique being applied by a builder for the first time. Further, it would not be possible to forecast the losses that might be incurred by the collapse of trenches or similar excavations in weather which would not greatly affect the work on bored piles.

Nevertheless, there are indications that under most conditions the short bored pile foundation will be somewhat cheaper than a comparable traditional footing in clay, made by present methods. In order to enable a rational comparison to be made the Building Research Station is continuing to investigate during construction the costs of short bored pile foundations.

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Multex

A New System of Construction

SINCE THE ADVENT of what is known as non-traditional building, the building industry has seen the introduction of many new components; most of them originated by manufacturers either because they felt there was a need for them or because they wished to make a contribution towards economy in labour or materials; design—as understood by architects—was not their aim. But now an architect has invented a component which, he stresses, is not just a new building unit but is the necessary factor in a system of construction. He feels that from the point of view of design it is desirable that building components should have the widest flexibility possible and be capable of the greatest number of applications and varieties in arrangement, for the three-fold purpose of satisfying designers, overcoming consumer resistance, and attaining the greatest economy by making mass production possible and attractive to manufacturers.

The inventor has given the name Multex to his system, which employs a basic unit capable of many variations, and as it is essentially a *system*, the materials of which the units can be made are not restricted to one kind; indeed, they can be of concrete, clay, tile, faience, plastics, metal, glass, and even—for internal work—wood and plaster.

The accompanying illustrations show the system and a few of its applications, and it will be seen that the basic unit is of such a shape that when a number are placed together, as in a wall, the projecting flanges form vertical channels and horizontal troughs, while the backs of the units are hollowed. These channels and troughs are always 3 in. square, but the thickness of the walls of the units can vary according to the material used. The dimension between the centres of the vertical channels is 18 in., and 12 in. between those of the horizontal troughs. These dimensions were chosen to suit production in a variety of materials and to make handling and transport easy, as well as to give flexibility in the design of a structure.

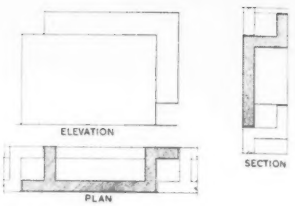
By using suitable stops in the mould during manufacture, one or more of the flanges can be omitted, and by this means over 60 variations from the basic shape can be made, but normally only four types would be needed in the case of a small house, for instance. As the units have right and left-hand projecting flanges it is possible to obtain variety in bonding by alternating the units. The only other unit needed is an angle piece, and this can form the heads and sills of openings as well as the quoins.

When the units are laid to form a wall the vertical channels are continuous and may be filled with plain or reinforced concrete; the horizontal troughs will also be continuous and may be similarly filled, but in this case breeze or similar blocks must first be put in the hollows in the backs of the units, or the troughs must be temporarily covered, to prevent the concrete welling out as it is poured.

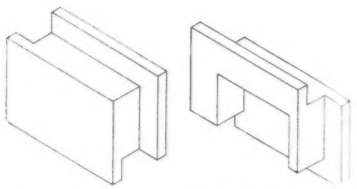
If the troughs and channels are filled with reinforced concrete then, according to the nature and placing of the reinforcement, the structure can be transformed into (1) a reinforced post and beam construction; (2) a continuously-reinforced concrete wall, or (3) a box frame construction, if the floors and roofs are integrated. With walls so constructed, continuous foundations will not always be necessary and may be replaced by point supports, especially when only light loads have to be considered. If additional load-bearing qualities are wanted, piers or struts can be incorporated by attaching shuttering to the framework of the external wall, the general thickness of the wall remaining the same.

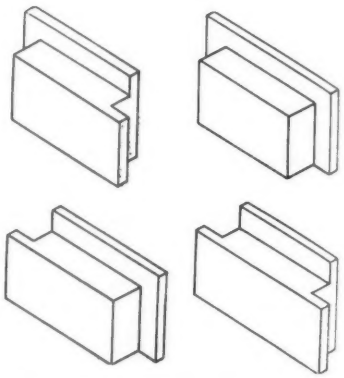
In addition to ordinary walling the system can be used for floors, roofs, piers, retaining walls, shaft and tunnel linings, reservoirs and similar erections. Some measure of prefabrication is also possible, especially in the lighter materials, because any convenient number of units can be pre-assembled as slabs, either on or off the site, and then be placed in position. The inventor points out that special plant or skill is not required by a builder using the system, and unskilled labour can be used if the setting-out is carefully done and there is adequate supervision. The system has the added advantage that no special plant for production is necessary.

The inventor claims the following advantages for his system: considerable saving in material; saving in relative weight and therefore in foundations and supports; rapidity of construction and saving of labour; the use of unskilled labour; and the carrying out of the constructional work of a building as a single continuous operation by one set of men. The units are not yet in production, and the accompanying illustrations are taken from analysis drawings prepared by two other architects who have also assisted in carrying out considerable experimental work.



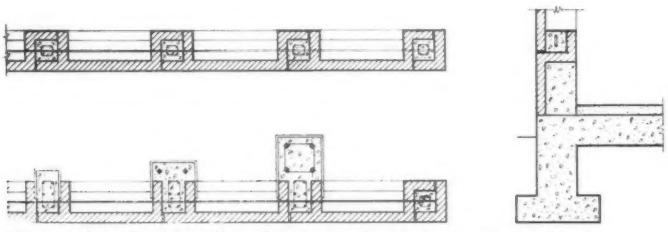
The basic unit

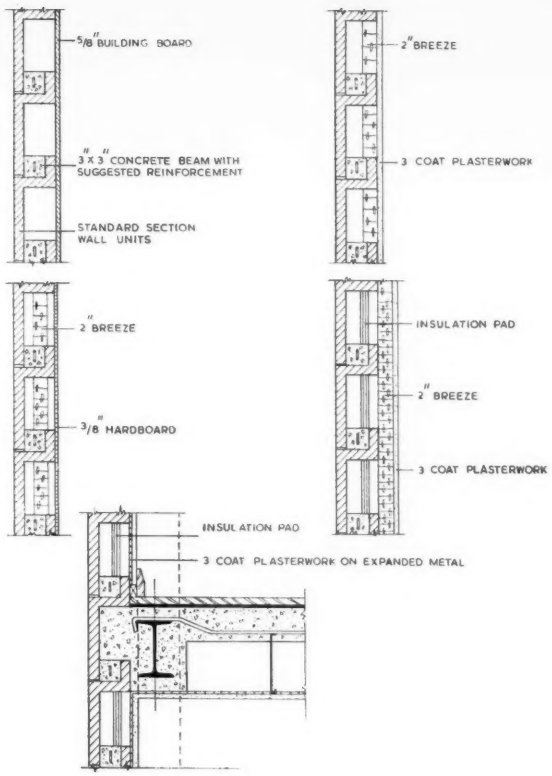

Perspective view of the basic unit. Left, the front. Right, the back

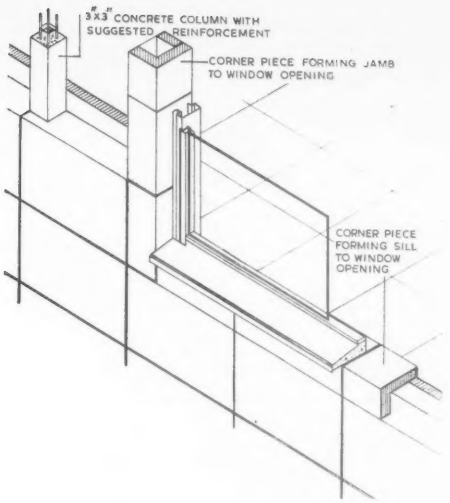

Some variations of the basic unit, produced by blocking off during manufacture

As only experimental work in concrete has been carried out, comparisons between Multex and other forms of construction can be only approximate, but as each Multex unit is equivalent to 16 bricks in 9 in. work, a rate of laying as low as six per hour would equal 96 bricks, or 768 per day. Experimental speeds up to 12 per hour have been achieved, an equivalent of 1,536 per day. In weight 9 in. brickwork is about 60 per cent greater than Multex. A cubic yard of concrete will produce 70 units, sufficient for 12 sq. yds. of walling.

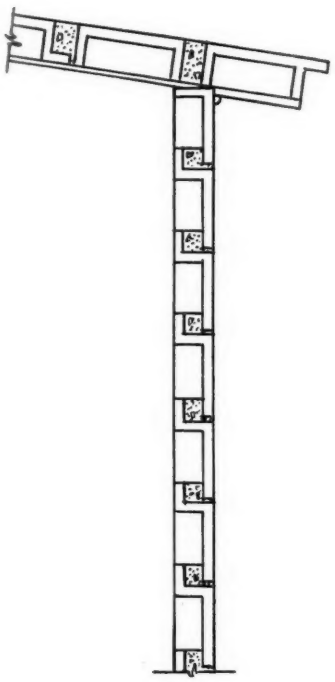
The thermal insulation of a Multex unit with a 4 in. cavity breeze block placed in the hollowed back gives a U value of .20, and this figure can be improved by additional insulation.

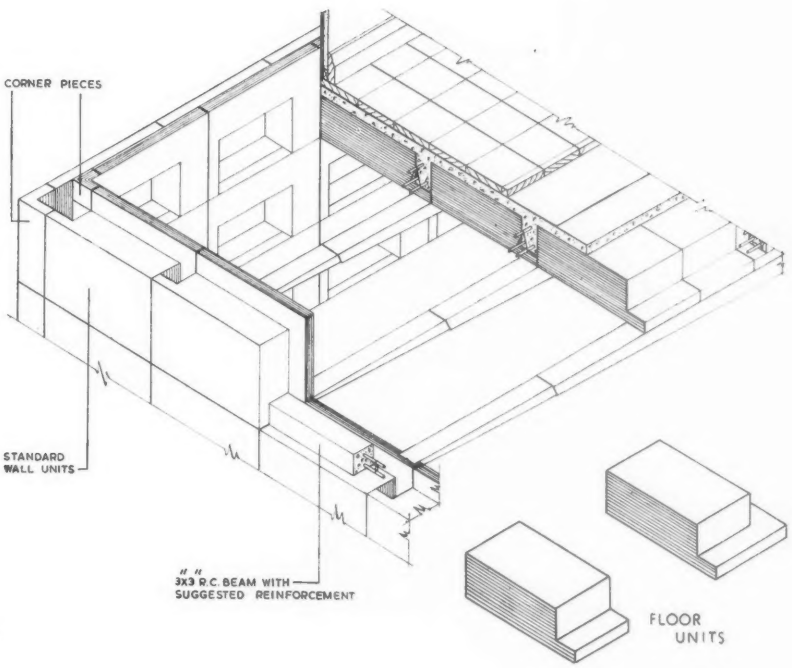

Plans and section of walling, showing methods of strengthening by piers




3"x3" CONCRETE COLUMN WITH SUGGESTED REINFORCEMENT
CORNER PIECE FORMING JAMB TO WINDOW OPENING
CORNER PIECE FORMING SILL TO WINDOW OPENING

Top left: sections through walling, showing methods of insulation and finish. Top right: application of the system at a window opening, showing jamb and sill. Bottom left: use of the system for roofing with standard units. Bottom right: use of the system for flooring with standard units





The Architect and his Profession in Byzantium

By H. A. Meek, B.A. [*A*]

The Essay awarded the Royal Institute Silver Medal and £50

IN THE YEAR 537, when the Gothic army under Wittig stood outside the walls of Rome, men were still to be found in the city who would come secretly at night to the Forum, trying in vain to force open the doors of the disused temple of Janus, in the hope that the two-faced deity might help the stricken city, since the God of the Christians seemed remiss.[1]

Rome was steeped in pagan tradition; a thousand deserted shrines and altars were sad reminders of a past glory which had faded, it was said, in proportion as the new religion gained strength. This was perhaps the deciding factor amidst many other considerations which had prompted Constantine, the first Christian Emperor, to make the final break with Rome in A.D. 330 and build for the declining empire a new metropolis in the east.

The extent to which the practice of architecture and its allied arts had been affected by the decline was conspicuously betrayed as Constantine proceeded with his ambitious plans.[2] While it was proposed to create a New Rome by the Bosphorus that would rival in extent and grandeur the Old Rome in the west, urban civilisation throughout the empire had been contracting and dwindling for over a century. In Gaul, Autun had shrunk from 500 to less than 25 acres, Bordeaux from 175 acres to 56 acres; in Britain the walls of Verulamium were tumbled in ruin, and the theatre no longer used. The cities of Greece and Illyria were shadows of their former selves, whilst even Alexandria is said to have lost 60 per cent of her population by the year 260.[3]

To trace in detail the causes of these developments would entail a profound investigation of the social and economic structure of the Roman Empire. We may say with fair certainty, however, that the seed of ruin lay in the low level of technique that persisted throughout the Graeco-Roman period in all sciences, save that of building itself. Increased use of slave labour took the place of advances in technical skill, so that as wealth became concentrated in the hands of the few, industry was faced with the problem of chronic under-consumption. The crisis due to a restricted internal market could be put off as long as the Roman Empire continued to expand, but the time came at last when the Emperor Hadrian perceived that a halt must be called before expansion became disintegration.[4]

When this stage was reached, difficulties began to multiply rapidly. With the ending of foreign wars, the supply of slave labour was greatly restricted. Resources shrank, and trade, hampered as always by the insecurity of ancient credit and uncertain communications, became local and provincial instead of international. A gradual reversion took place to small-scale craftsmanship, and industry was transferred from the cities to villages and large country estates.

The growth of these estates, with their 'nuclear' economy, parallels the decline of the cities and their partial abandonment. By the latter part of the 3rd century building activity was reduced to a mere trickle, and even this was of the simplest structural character: instead of the soaring domes and vaults of the age of Hadrian, recourse was had to primitive pitched roofs of wood. Masonry work was shoddy, while to provide columns and ornamental work of any kind, old buildings had to be ransacked. Under these conditions there is little wonder that the architectural profession, once so lucrative, lost numbers rapidly.[5]

* * *

In the palmiest days of the empire, Pliny the Younger had written to Trajan from Asia Minor asking for the despatch of an architect to settle certain local building problems. Replying in that tone of mild irony which he sometimes used with his harassed proconsul, 'My dear Pliny,' the Emperor had remarked, 'you can't be short of architects. There is no province which does not have men of skill and ingenuity, and you surely don't suppose it would take less time to send one from Rome, since they usually come to us, too, from Greece.'[6]

But as the active town senates so vividly depicted by Pliny gradually ceased their building enterprises, architects lost their patrons, and lack of practice led to a deterioration in skill. In the 3rd century both Alexander Severus[7] (222-235) and Aurelian[8] (270-275) tried to promote architectural studies by making grants to teachers; their efforts, however, could do little to arrest a decline whose origins were social and economic. The line of great architects mounting back through the reign of Augustus to the golden age of Periclean Athens was broken, and seemed about to perish for all time.

In these circumstances it is not surprising that Constantine rapidly found himself in serious difficulties as his plans for Constantinople came to be realized; and in A.D. 334, four years after the official foundation of the city, he issued the following decree to the Pretorian Prefect Felix, governor of Italy and Africa:

'As many architects as possible are needed; but since there are none to be had, Your Grace is to encourage young men in the

[1] Procopius, *de bello Gothico* I.25.

[2] On the amazement excited as the Emperor delineated the proposed boundaries, see Philostorgius, *Historia Ecclesiastica* II.9.

[3] See F. W. Walbank, *The Decline of the Roman Empire in the West* (London, 1946), p. 44.

[4] On the low level of ancient technology, see Walbank, op. cit., c.iv. For other causes of the Roman decline see among many others, the appendix after ch. 38 of Gibbon's *Decline and Fall*; M. Cary, *A History of Rome down to the time of Constantine* (London, 1935), pp. 771-9; M. Rostovtzeff, *Social and Economic History of the Roman Empire* (Oxford, 1926), pp. 478-87.

[5] On the deterioration of building technique: A. H. M. Jones, *The Greek City from Alexander to Justinian* (Oxford, 1940), pp. 278-9.

[6] Pliny, *Ep.* X. 49. 'Architecti tibi deesse non possunt. Nulla provincia est, quae non peritos et ingeniosos homines habeat; modo ne existimes brevius esse ab urbe mitti, quum ex Graecia etiam ad nos venire soliti sint.' (Where no other acknowledgment is made, the present writer is responsible for the translation of texts cited in English.)

[7] '. . . mechanicis, architectis salaria instituit et auditoria decreuit et discipulos cum annonis pauperum filios ingenuos dari iussit.'—Lampridius in *vit. Alex. Severi, c.* 44.

[8] 'Decreuit emolumenta architectis et ministris.'—Vopiscus in *vit. Aurel, c.* 35.

African provinces to take up this study, who are about eighteen years of age and have enjoyed a liberal education. In order to attract them, we desire that both they and their parents shall be immune from the usual personal obligations to the state, and that a sufficient grant be made to those who study.'[9]

What were the qualifications asked for in those who were to commence the study of architecture? To attempt an answer we must re-examine the phrasing of this edict.

The words translated above as 'enjoyed a liberal education' stand in the original as *liberales litteras degustaverint*. This expression has been subjected to scrutiny by the Swiss jurist Jacques Godefroy, whose critical edition of the *Codex Theodosianus* was published posthumously in 1665. Godefroy maintains that the use of the verb *degustare* (which in some contexts can mean 'to touch lightly upon') carries with it the implication that only a smattering of polite learning is necessary for the architect: 'It is quite sufficient if he has a moderate acquaintance with those parts of the various branches of learning which have to do with architecture, so that if it is necessary for him at any time to give judgment or approval of anything concerning these arts, he will not be found lacking.' In support of this contention, Godefroy refers to the remarks on architectural education which Vitruvius had placed in the introduction to his work on architecture. The Augustan author, however, had used a turn of phrase less liable to scholarly devaluation: as the first of the architect's qualifications he says simply that 'he should be lettered'—*litteratus sit*. It is when we consider the reason Vitruvius gives for this requirement that Godefroy seems perhaps on firmer ground: 'The architect,' he says, 'must be acquainted with letters so that he can jot down notes and memoranda';[10] and the study of history is justified in the same vein, as enabling the architect to cite the correct myth, for example, when a client asks about the origin of the Caryatids.

But the fact that Constantine suggests the study of architecture should commence at 18 is sufficient to show that a similar type of secondary education was intended to precede the specialized courses as was customary in the other learned professions, by analogy with which we may, with little risk of error, reconstruct the school career of the early Byzantine architect.[11]

The language and content of East Roman education was Greek from the fourth century on; but as the *koine* or common speech of this region was already considerably different in pronunciation from that of the classical tongue, the art of writing and spelling had to be acquired by much application. This was the task of the future architect in his elementary school, which he attended from the age of six.

After he had mastered the elements of 'orthography', he would proceed at the age of 10 to the 'beginning of learning' (τὰ πρῶτα μαθήματα). While a careful reading of the ancient authors under the tuition of 'grammarians' would implant in him a ready familiarity with classic speech and thought, he would also begin his acquaintance with the quadrivium, whose further study played such an important role in his vocational course. The quadrivium consisted of geometry, arithmetic, music and astronomy, that is, the four non-literary branches of the seven liberal arts; an ancient classification of learning which at this period began to assume the inflexible framework which was to persist as the vehicle of scholastic knowledge to the close of the middle ages. Architecture and medicine had been included in the canon by Varro (116-27 B.C.), but his was an exceptional theory and in Byzantine times these subjects were reserved for professional instruction.[12]

The study of geometry seems to have been fairly widespread amongst the educated classes of East Rome. Byzantine architects and writers on architectural subjects consistently show familiarity with geometrical methods and technique in their work, and a knowledge of geometry is even apparent in verse descriptions of famous churches.[13] The wide currency of technical terms, and the production of such remarkable works as Heron of Alexandria's book *On Vaulting*, argue a considerable public understanding of at least the elements of this subject.[14]

The constituents of the quadrivium were known as 'the four servants of true knowledge', with philosophy as their mistress, and it was the study of philosophy and rhetoric which would occupy the final years, from 16 to 18, of the architect's general education. For this he might attend one of the great universities of the Eastern Empire, at Athens or Constantinople.

Architecture does not seem to have been taught at University, and no provision for appointing professors and lecturers in this subject is made in the edict of Theodosius II (A.D. 425) reorganizing the University of Constantinople.[15] Encouragement to take up the vocation of teaching architecture, however, was afforded by a decree of the Emperors Constantius and Constans, dated 344,[16] though we do not know of any school of architecture which acquired eminence or reputation comparable, for instance, to that enjoyed by the famous School of Law at Berytus.

What subjects was the Byzantine architect supposed to have mastered? Some light on this topic has been shed by a Greek writer on mathematics in a passage to which attention has only recently been drawn.[17] It occurs in the *Synagoge* or *Collection* of Pappos of Alexandria, a work dealing with the classical geometry of the Greeks and dating from the 4th century A.D. Book 8 of the *Synagoge* is devoted to mechanics: the relation of this science to mathematics generally is discussed in the preface, and the author goes on to observe: 'The mechanicians of Heron's school say that Mechanics can be divided into a theoretical and a manual part; the theoretical is composed of geometry, arithmetic, astronomy and physics, while the manual part consists of work in metals, building construction, carpentry, painting and the practical execution of these matters. The man who has been trained from his youth in the aforesaid sciences, as well as practised in the aforesaid arts, and in addition has a versatile mind, will be, they say, the best architect and inventor of mechanical devices. But when it is impossible for the same person to familiarize himself with such mathematical studies and at the same time to learn the above-mentioned crafts, they instruct anyone wishing to undertake practical tasks in mechanics to use the resources he already possesses in the various tasks to be performed.'

It will not, perhaps, appear immediately obvious why such a syllabus should be found in a treatise which professes to deal with mechanics. The reason lies in the fact that the term *mechanicus* (μηχανικός),

[9] 'Architectis quamplurimis opus est; sed quia non sunt, Sublimitas Tua in prouinciis africanis ad hoc studium eos impellat, qui ad annos ferme duodeuiginti nati, liberales litteras degustauerint. Quibus ut hoc gratum sit, tam ipsos quam eorum parentes, ab his quae personis iniungi solent, uolumus esse immunes; ipsisque qui discent, salarium competens statui.'—*Codex Theod.* lib. xiii, tit. 4, lex 1.

Mr. Martin S. Briggs, who refers to this edict in his book, *The Architect in History* (Oxford, 1927), says (p. 47) that 'the students were to be about 22 years of age'; presumably a misunderstanding of duodeuiginti. Curiously enough, the learned Unger in his *Quellen der Byzantinischen Kunstgeschichte* (Vienna, 1878) also missed the mark here, giving *etwa zwanzig Jahre alt* in his citation of the passage.

[10] 'litteras architectum scire oportet, uti commentariis memoriam firmiorem scire possit.'—*de arch.* I. 1.

[11] On Byzantine education, see Louis Bréhier, 'Notes sur l'histoire de l'enseignement supérieur à Constantinople' in *Byzantion* iii (Brussels, 1927), pp. 73-94; J. M. Hussey, *Church and Learning in the Byzantine Empire* (Oxford, 1927), pp. 22-116; C. Barbagallo, *Lo stato e l'istruzione pubblica nell' Impero Romano* (Catania, 1911), pp. 220, 226, 230; and the remarkable essay by Georgina Buckler in *Byzantium, an Introduction to East Roman Civilization* (Oxford, 1949), pp. 200-220.

[12] Varro gave his views on the quadrivium in the lost work *Disciplinarum libri xi*; these views were, however, transmitted in the *Satyricon* of Martianus Capella (5th cent. A.D.), which survives.

[13] e.g. Constantine of Rhodes' description of the Church of the Apostles.

[14] On the Byzantine study of geometry, see G. Downey in *Byzantion*, xviii (1948), pp. 117-118; Ivor Thomas, introduction to *Selections Illustrating the History of Greek Mathematics*, Loeb C.L. (London, 1939-41); F. Lund, *Ad quadratum; a study of the geometrical bases of classic and mediaeval religious architecture* (London, 1921).

[15] *Codex Theodosianus*, lib. xiv, tit. 9, lex 3.

[16] *Cod. Theod*, lib. xiii, tit. 4, lex 3. '. . . in par studium docendi adque discendi nostro sermone perpendimus. Itaque immunitatibus gaudeant, et suscipeant docendos, qui docere sufficiunt.'

[17] By G. Downey, 'Pappos of Alexandria on architectural studies' in *Isis*, xxxviii (1948), pp. 197-200, and in *Byzantion*, xviii (1948), pp. 105-109. The text of Pappos quoted is based on the versions of Thomas and Downey.

occasionally used in earlier literature[18] to signify an architect, had come by the 4th century to supersede entirely in this sense the word *architectus* (ἀρχιτέκτων), which in its turn was devalued and acquired the meaning of 'master-builder'. Hence the expression ἡ μηχανικὴ θεωρία 'the science of mechanics' besides retaining its original implication as a branch of physical science, was used in a secondary or additional acceptance as 'the art of architecture'. The change in title from *architectus* to *mechanicus* involves problems of semantics whose discussion can find no place in the present essay; it is probable, however, that the later name bears some relation to the advances made in structural mechanics which were beyond the scope of the old *architectus* and his training.

Pappos's curriculum immediately calls to mind the programme set forth by Vitruvius 300 years earlier. The Byzantine scheme is less pretentious and more practical than its forerunner, though it is to the latter that we must refer if we wish to explain some of the subjects common to both. Music, for example, is necessary to the architect not only that he may be able to resolve the usual problems of acoustics, but also that his ear may be attuned to the note given out by the ropes of certain ballistic devices when stretched to a critical tautness—a contingency encountered by the architect in his occasional rôle of military engineer.[19] A knowledge of astronomy was required to enable him to determine aspects and orientations in an age unequipped with the compass.

In the passage from the *Synagoge* quoted above, the final sentence, though its meaning is not entirely clear, implies that below the mechanicus stood certain lesser degrees of technicians, who had not completed the entire architectural course. These, it has been conjectured, might be the persons named in inscriptions and elsewhere as ἀρχιτέκτονες,, 'master-builders' or μηχανικῶν ἔργων εὑρετεῖς 'mechanical engineers'. The mechanicus himself was a person of great technical standing, and often of high social rank: thus the names of architects are found dignified by several of the grandiloquent titles of the later Empire. Cyriades, for example, who worked for Theodosius the Great, is called 'Count and sometime Consul'[20]; Auxentius, a contemporary, is also a count[21]; and Isidore, who was one of Justinian's architects, is styled in an inscription 'Most Magnificent and Illustrious'[22]. Alypius of Antioch, indeed, whom the Emperor Julian commissioned to rebuild the Temple at Jerusalem, had at one time been Proprefect of Britain, but his was a career of exceptional *splendeurs et misères*: the work at Jerusalem was abandoned in the face of unmistakable manifestations of divine wrath, while Alypius himself some years later was tried on a false charge of poisoning, found guilty and sentenced to banishment, his property being seized for the Emperor Valens[23].

* * *

Any consideration of the status of architects in Byzantium must take into account the evidence provided by Procopius of Caesarea[24]. This able historian is our main authority for the reign of Justinian, and was present as an eye-witness and participant of the events he describes in his *History of the Wars*. In his book *On Buildings*, he sets out to give a comprehensive account of the principal works of architecture and civil engineering carried out under Justinian. His narrative is remarkable for the tone of lavish flattery he adopts towards the Emperor, whom he was anxious to gratify. (His real opinions of this prince were reserved for a scandalous *Secret History* which was published posthumously.) Justinian, accordingly, as the initiator of the principal building schemes of his age, is given most of the credit for the work, while the two chief architects of the day, Anthemius of Tralles and Isidore of Miletus, are mentioned as 'serving' or 'assisting' the Emperor in his undertakings. They are represented in moments of crisis, or when faced with extraordinary problems, as despairing of their technical skill and resorting to the Emperor for advice. Thus, during the construction of Santa Sophia, the centering of one of the major arches began to crack under the tremendous weight of masonry resting on it. Anthemius and Isidore, terrified, hasten to Justinian and implore his advice. 'And immediately the Emperor, prompted by I know not what, except, presumably, by God (for he himself is not an architect), ordered them to complete the construction of the arch. "For," he said, "when it rests on itself, it will have no further need of centering.[25]"'

In view of this magnification of Justinian's rôle, and the concomitant writing down of the architect's part, the status of the latter has been called in question by some commentators,[26] who have urged that the title μηχανικός (*mechanicus*) should be translated 'master builder' rather than 'architect'. But this interpretation weakens the force of Procopius's flattery, where the implication is that Justinian, although 'he himself is not an architect', is nevertheless able through divine intuition to come to the rescue of fully qualified professional men in their hour of need. Although this may seem a somewhat laboured piece of adulation, it chimes in with the traditional view whereby 'each Roman and Byzantine Emperor was regarded as the direct source and origin of all the public building operations executed during his reign.'[27] Procopius states clearly enough elsewhere (*de Aedif.* I. i. 24) that Anthemius and Isidore 'co-ordinated the work of the various tradesmen, and prepared in advance the plans of future projects'[28]. We need assign no more weight to the deference shown Justinian than to the ritual homage paid to the Grey Eminence in the preface to any Soviet handbook.

A more balanced view of the architect's position in the 6th century is afforded by an examination of the state papers of the Gothic kings of Italy, who ruled that country for 60 years after the fall of the Empire in the west; and although intended for use in the west, they may nevertheless be taken to apply to the corresponding offices in the Eastern Roman Empire.[29]

These papers are preserved for us in the *Variae*, or correspondence, of Cassiodorus, a Roman citizen who in the course of a long life acted as secretary to most of the Gothic sovereigns. The sixth and seventh books of the *Variae* consist of a number of formulae, that is, model documents to be used when appointing persons to the different offices of the state, such as pretorian prefect, quaestor, etc. They are framed so that they may be copied out and used as often as required, the name of the individual appointee simply being inserted at the head. Each formula contains such information and good advice concerning the office as Cassiodorus thought suitable.

The fifth formula in book seven is for use whenever a Palace Architect is appointed. It begins with a characteristic flourish, in what Cassiodorus called the Third or Supreme Style of oratory: 'Much do we delight in seeing the greatness of our kingdom imaged forth in the splendour of our palace.' From the palace foreign diplomats derive their first impressions, and the architect, by his work there, has an opportunity of achieving everlasting fame. 'See that your new work harmonises well with the old. Study Euclid—get his diagrams well into your mind; study Archimedes and Metrobius.' Here the emphasis on geometrical knowledge is again evident which we observed previously in discussing the architect's training.

The formula continues with a reference to town planning and military work: 'When we are thinking of rebuilding a city or of founding a fort or a general's quarters, we shall rely on you to express our thoughts on paper. The builder of walls,

[18] Tacitus (*Annal.* xv, 42) employed this word with the sense of 'architect' in the 1st century A.D. See E. Saglio *s.v.* in Daremberg et Saglio, *Dictionnaire des antiquités grecques et romaines* (Paris, 1877), and G. Downey in *Byzantion*, xviii, pp. 108-111.

[19] This part of the ancient architect's duties is exhaustively dealt with by Waltur Sackur in his book *Vitruv und die Poliorketiker* (Berlin, 1925).

[20] vc comes et mechanicus.—Symmachus, *Ep.* V.76.

[21] Comes et mechanicus.—Symmachus, *Relat.* 25.

[22] μεγαλοπρεπέστατος ἰλλοδστριος καὶ μηχανικός, Inscription at Chalcis sub Belo in Syria (*Iglsyr.* II, no. 348).

[23] Ammianus Marcellinus, lib. xxiii, 1-2, and lib. xxix, c.l, par. 44.

[24] For a recent estimate of this historian and his motives, see P. N. Ure, *Justinian and his age*, pub. Pelican Books (London, 1951), pp. 169-184.

[25] Procopius, *de aedif.* I. i. 67-72.

[26] e.g. by G. Downey in his introduction to H. B. Dewing's edition of Procopius *On Buildings* (London, 1940).

[27] Downey, *ibid*, pp. xii-xiii.

[28] Procopius *de aed.* I. 1. 24: τοῖς τεκταινομένοις τὰ ἔργα ῥυθμίζων τῶν τε γενησομένων προδιασκευάζων ἐνδάλματα.

[29] On the applicability of his formulæ to conditions in the Byzantine Empire, see Ure, *Justinian and his age*, p. 106. The text quoted is in the translation of T. Hodgkin (London, 1886). See M. S. Briggs, *The Architect in History*, p. 49.

the carver of marbles, the caster of brass, the vaulter of arches, the plasterer, the worker in mosaic, all come to you for orders, and you are expected to have a wise answer for each. But then, if you direct them rightly, while theirs is the work yours is all the glory.

'Above all things, dispense honestly what we give you for the workmen's wages; for the labourer who is at ease about his victuals works all the better'. This last was no superfluous warning, since a *cause célèbre* of the reign of Theodosius the Great had been the impeachment of the distinguished architect Cyriades on a charge of squandering the funds entrusted to him for the erection of a basilica and a bridge which he had designed.[30]

The formula concludes with a curious glimpse of Vitruvian pomp: 'As a mark of your high dignity you bear a golden wand, and amidst the numerous throng of servants walk first before the royal footsteps, that even by your nearness to our person it may be seen that you are the man to whom we have entrusted the care of our palace.'

In this summary of the architect's duties we see him in his true light as designer and organiser—in that aspect, in fact, which has been played down in the contemporary account of Procopius, where the intention is to magnify the rôle of Justinian. Cassiodorus shows the architect as conversant with all trades, and controlling building operations from the design stage to the payment of workers. He is a man of learning and of high professional status, capable alike of designing a new town as of matching classic details in the repair or extension of ancient work.

* * *

When Aemilius Paulus returned to Rome in 168 B.C. from the conquest of Macedonia, Plutarch tells us that three whole days were allotted for the celebration of his triumph, while the spoils of victory proved sufficient to free the Romans from taxes till the consulship of Hirtius and Pansa 125 years later.[31] But in the course of centuries, as the declining empire passed from aggressive expansion to defence, the loot of foreign wars was no longer forthcoming to lighten the burden of taxation. Though populations declined and resources shrank, the cost of imperial administration remained high, and urgent measures were needed to extract sufficient revenue from the people, and to secure labour for the essential tasks of the empire.

To meet these desperate circumstances, the later emperors created a formidable system of regulations and orders. As early as the time of Trajan, the lower and middle grades of local officials were recruited by compulsion; eventually the entire labour force of the empire was organised in corporations. This result was achieved through the development of *collegia*, originally voluntary craft guilds, but later officially sponsored and set up by direct state action.[32] The 4th century saw complete government control established, regulating every action of every individual. All trades and occupations, from innkeepers and fishmongers to civil servants and goldsmiths were organised in *collegia*; and membership of the *collegia* was hereditary, so that men were bound to their occupation: a decree of A.D. 405 even forbids bakers to marry outside their trade, while those who worked in the mines, quarries and arms factories were branded.

As part of the struggle to stabilize social conditions, the Emperor Diocletian issued an edict in the year 301 commencing with the significant words 'Uncontrolled economic activity is a religion of the godless.' The object of this remarkable law is to fix prices and maximum wages throughout the empire, any breaches being punishable by death. No article, trade or profession is overlooked. Teachers of architecture are awarded 100 *denarii* per pupil per month,[33] a sum whose value has been disputed. If, as seems probable, the copper *denarius* of that realm is implied, the fee is equivalent to 1*s.* 8*d.*, a pitiful reward for any métier.

The decree proved abortive, and before long fell into abeyance, but a system of food subsidies was built up, in return for which guild members performed compulsory services. 'Everywhere,' writes Professor Walbank, 'men lived under military discipline, and did the tasks they were born to do. The world of free exchange and *laisser-faire* was utterly dead'.[34]

Auguste Choisy, in his book *L'art de bâtir chez les byzantins* (1883) found it inconceivable that conditions such as these should have prevailed amongst the free-souled Greek subjects of the Eastern Roman Empire.[35] He was prompted to this view in the first instance by an inspection of the colonnade at Soli, where he found that the Byzantine masons had expressed their personalities in the column capitals with an abandon unmatched even by the greatest individualists of the High Gothic. To rationalize this sentiment, he made a somewhat inconclusive examination of various edicts in the *Codex Theodosianus*, which led him to infer that the laws in question did not operate in the eastern half of the Empire, which, he asserted, remained free of such authoritarian measures.

These illusions were summarily dispelled through the discovery and publication in 1893 of the *Book of the Prefect*, by Professor J. Nicole. This edict of Leo VI shows the corporate state in full flower at Constantinople. Every trade and industry is organised in corporations under rigorous state control, and regulations govern guild membership, permissible profits and even such details as the siting of shops and factories.[36]

This was the path marked out for the profession of architecture also, and the indications of it appear early. Three years after he had issued his first order to recruit architects, Constantine sent the following edict to the Pretorian Prefect:

'We order that the practitioners of the arts listed below, in the respective cities where they are residing, be exempted from all obligations, in order that they may acquire the leisure for studying their arts and so may be the more inclined to obtain greater skill themselves *and pass on their knowledge to their sons.*

'Architects, ceiling makers, plasterers . . .' (35 trades and professions are listed in all).[37]

The ultimate intentions of those who framed this law are made obvious in its concluding words. The guild of architects is to become hereditary; sons are to learn the art from their fathers, and the profession, which was beginning to receive an influx of new blood from graduates recruited under the edict of 334, is to harden into a caste. This purpose is confirmed by the event. Throughout the 4th and 5th centuries the art of architecture becomes increasingly a family calling, something to be learned from one's father as one grew to manhood, and marked by family usages and knacks. Thus in the 6th century Justinian is served successively by Isidore the Elder of Miletus and his nephew, Isidore the Younger.[38] This practice spelt inevitable ruin for the schools, and all mention of them is deleted from the *Institutes*, Justinian's redaction of Roman Law, together with the special privileges and exemptions that had been held out to young men two centuries before as an inducement to study architecture.

Byzantium in the time of Justinian has been called 'a purely conservative community'.[39] The atmosphere of the times was one of rigid conformism, both in religion and politics, and such dissentients as emerged could do little but content themselves with the dismal solace of a posthumous protest. It might well be

[30] Symmachus, *Ep.* V. 74, X. 39, 40.

[31] Plutarch in *vit. Aem. Paul.* Cf. Cicero, *de Off.* II. 22.

[32] E. H. Freshfield, *Byzantine guilds, professional and commercial* (Cambridge, 1938); Walbank, *op. cit*, pp. 47-49.

On the activities of the 4th century emperors, the observation of Rostovtzeff is worth quoting: 'Their aim was to save the Roman Empire and they achieved it. To this end they used, with the best intentions, the means which were familiar to them, violence and compulsion. They never asked whether it was worth while to save the Roman Empire in order to make it a vast prison for scores of millions of men.'—*Social and Economic History of the Roman Empire*, pp. 477-8.

[33] '. . . architecto magistro per singulos pueros menstruos denaria centum.' This edict has not survived in any of the recensions of Roman Law, as it was already in abeyance by the time the *Codex Theodosianus* was compiled. It was recovered during the 18th and 19th centuries from archaeological sources. Mommsen and Blümner, *Das Edict Diocletians* (1893).

[34] Walbank: *op. cit*, p. 50.

[35] *Op. cit*, pp. 169-170, 175-177.

[36] Jules Nicole, *Le livre du Préfet* [ἐπαρχικὸν βιβλίον] (Geneva, 1893). See André M. Andréades, Byzance, paradis du monopole et du privilège, in *Byzantion*, ix (1934), pp. 171-181.

[37] 'Artifices artium, brevi subdito comprehensarum, per singulas civitates morantes, ab uniuersis muneribus uacare praecipuimus: siquidem, ediscendis artibus otium sit adcommodandum, quo magis cupiant et ipsi peritiores fieri, et suos filios erudire.

'Architecti, laquearii, albarii, etc.'—*Cod. Theod.* lib. xiii, tit. 4, lex 2.

[38] Procopius *de aed.* II. viii. 25.

[39] P. N. Ure, *op. cit.* p. 253.

thought that in this mental climate the architect, trained as he was in the school of tradition, would stagnate utterly, or at most be content with preserving the legacy of the past with the possible addition of minor improvements. Had this been the case, such buildings as S. Vitale or S. Apollinare in Classe would have marked the acme of Byzantine achievement.

There existed, however, within the bounds of the Eastern Roman Empire men of an irrepressible fertility of mind, who, while accepting the religious and political circumstances of the times were able to canalise their inventiveness into the projection of great works of architecture. At a time when innovation was a term of grave reproach, Anthemius of Tralles and Isidore of Miletus succeeded in creating for the service of religion a masterpiece of art the like of which had never yet been conceived, at once so daring in structure and so magnificent in appearance, that the Emperor Justinian was moved at the sight of it to exclaim in an ecstasy of triumph, 'Solomon, I have surpassed thee!'

Both the architects of the church of Santa Sophia originated from the Ionian littoral of Asia Minor, the cradle of Greek philosophy and science over a thousand years before. Anthemius came of a very gifted family; one of his brothers was a distinguished man of letters, one was a successful lawyer and two others were famous doctors. His personality does not emerge very clearly from the pages of Procopius, who allows no satellite to share Justinian's *éclat*. A much livelier glimpse of the great architect, however, is afforded by the genial Agathias, an historian 30 or more years junior to Procopius. Anthemius, he observes, quarrelled with the man who lived in the flat above him, a famous lawyer of Constantinople named Zeno. Having been reduced to silence by the latter's unparalleled command of language, the architect of Santa Sophia contrived an expedient which proved him a true *mechanicus* in every sense. He had a theory that earthquakes were caused by the action of hot air or steam seeking to emerge from subterranean passages, and this hypothesis he proceeded to demonstrate empirically. He made up a series of leather pipes with funnel-shaped ends, and having removed part of his ceiling, he applied these ends with a hermetical tightness to the underside of the lawyer's floor. The other ends of the pipes were fitted to a number of water caldrons, which he heated with a powerful flame. The earthquake which he had anticipated took place, and Zeno and his friends rushed into the street discomfited.[40]

Men of Anthemius's turn of mind could find outlets for their talents, whether serious or absurd, when idealists and politicians had to repress all but the most orthodox promptings. Indeed, to the architects of Justinian's age conditions for creative work and complete self-expression were perhaps more readily available than for any other class of citizens, and men of outstanding genius arose who exploited to the full the possibilities of their times. Yet nothing could be farther from the truth than the assertion, often made, that the remaining millennium of Byzantine history is one of stagnation, in which architects could do no more than reproduce in lifeless transcript the forms evolved by the great men of the 6th century. While Constantinople survived, it showed itself capable of producing again and again periods of wonderful brilliance. Under the Macedonian Emperors fresh heights were reached, and the *Nea* or New Church built for Basil I at the end of the 9th century provided an inspiration to the architects of the time comparable to that afforded 300 years earlier by Santa Sophia.[41] In the years which followed, though no major innovations were effected, yet architects were always to be found who made ingenious and even enchanting use of the traditional forms[42]. Their vision fades and vitality quits their art only after the Great City itself had fallen, and the Byzantine Empire lay extinct for ever.

[40] Agathias lib. v, cc. 6-7.

[41] See the remarks of Ch. Diehl in his essay on Byzantine Art contributed to *Byzantium, an introduction to East Roman Civilization*, p. 179.

[42] e.g. the Church of the Pantanassa (Mistra, first half of 15th cent.), Serbian Monastery at Decani (first half of 14th cent., Fetiyeh Djami (Constantinople, early 14th cent.), Church of the Holy Apostles (Salonica, 1312-15), and the Peribleptos (Mistra).

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Practice Notes

Edited by Charles Woodward [*A*]

IN PARLIAMENT. Housing. Defence Regulation 68 (c) (A). In answer to a question the Parliamentary Secretary to the Ministry of Housing and Local Government said that consultations have been going on with local authority associations on the question, not merely whether the Regulation should be allowed to lapse at the end of the year, but whether in view of its overlap with planning powers it should not be revoked right away. Whilst it is not agreed that revocation would involve the loss of a considerable amount of housing accommodation, since local planning authorities have ample powers to prevent that, the Minister has decided against immediate revocation. (25 March 1952.)

Building Licences (Deferment). In reply to a question the Minister of Works said that the standstill in sanctioning new starting dates for building work, other than housing, ended on 29 February 1952. New starting dates since that date are being awarded according to the local availability of building labour. Appropriate priority is given to buildings required for defence and for the export trade. (25 March 1952.)

Painting and Decorating (Licensing Control). In reply to a question the Minister of Works said that he could not see his way to remove painting and decorating work from licensing control. There is a shortage of painters during the summer months. Licences are issued freely in winter months to reduce seasonal unemployment, and he would like to see more painting deferred from summer to winter. (25 March 1952.)

MINISTRY OF HOUSING AND LOCAL GOVERNMENT. Revision of Housing Subsidies. Circular 31/52 dated 29 February addressed to housing authorities in England and Wales refers to the revision of housing subsidies and to the necessary legislation which will be introduced in Parliament at an early date. Pending that legislation, payment of all subsidies will continue to be made at the existing rates, and adjustment will be made later.

Exchequer grants to persons other than local authorities for the building of new houses for members of the agricultural population will continue unchanged at £15.

'Non-Traditional Houses.' Circular 28/52 dated 6 March addressed to housing authorities in England refers to the expansion of the housing programme over the next three years by the use of 'non-traditional' methods. It is pointed out that the erection of 'non-traditional' houses on the site takes up to 50 per cent less man hours and an even lower proportion of skilled labour in certain trades. On average such houses are completed in four-fifths of the time similar traditional houses take to build. The Minister has asked the firms mainly concerned in 'non-traditional' methods to what extent they can increase production, and asks local authorities how many more they will build. He has also told them that he will feel justified in offering increased programme instalments if they will have more houses built by the new methods. Housing authorities will be able to allot private enterprise licences up to half of any approved increase in their programme.

The Minister proposes to agree with the firms on prices for each type of house in each Region. Contractors would not always tender at these prices, owing to site conditions and other variations; but where a tender price for the basic items is at or below the agreed figure approval can be given more quickly.

Fireguards. Street Widths. Circular 30/52 dated 13 March and addressed to housing authorities in England refers to safety specifications for gas and electric fires issued by B.S.I. They are B.S. 1250 Amendment No. 1 (September 1951) for gas fires and B.S. 1670 (1951) for electric fires. The Minister hopes that local authorities will specify the new standards for either Council houses or elsewhere on Council property. Serious injuries are caused by insufficient, inefficient or complete absence of fireguards.

Appendix A to the Housing Manual 1949 recommended certain minimum street widths in residential areas, and these have been studied by the associations of local authorities. In consequence Appendix A of the Manual has been revised in the last two columns referring to waiting bays or lanes in a minor street, cul-de-sac, a street bordering on an open space and a footway as the only means of access to a building more than 150 ft. from a carriageway measured along the footway.

These changes will be incorporated in any subsequent reprint of the Manual.

MINISTRY OF WORKS. Building Licences and Professional Fees. Press Notice MOW/21/52. P.I.49 issued by the Ministry of Works and dated 7 March draws the attention of architects, surveyors and other professional advisers to the Judgment of the Court of Appeal in Young v. Buckles on 15 January 1952. This judgment made it clear that professional fees were not part of the licensable cost of building work, and they should, therefore, no longer be included in applications for building licences.

Price Control of Building Materials. The Minister of Works stated in the House of Commons on March 11 that he had removed price control from plasterboard, gypsum rock, building plasters, sanitary fireclay, asbestos cement, lead sheet and pipe, sanitary earthenware, cement (ordinary Portland and rapid hardening) and certain types of flat glass. (MOW/22/52. P.I.73.) Most of the industries concerned would have been granted increases of price to cover increased costs of coal, freight, raw materials, etc. They have now given assurances that they will keep such increases to a minimum and will establish prices which will remain firm during 1952 unless there are further major increases in cost.

Cast Iron Baths. Price Control. An increase of 2½ per cent for commercial quality baths for the home trade has been fixed to take effect from 20 March 1952. The British Bath Manufacturers' Association have informed the Minister that it was their desire to establish a firm price for the coming year and not to increase prices again unless there were further major increases in costs. On the basis of these assurances price control over these baths has been withdrawn. (MOW/25/52. P.I.73. 18 March.)

Timber Licensing for Building. On 1 April 1952 the Ministry of Works will take over from Timber Control the consumption licensing of softwood, hardwood and plywood required for (1) all private building work (other than housing) costing less than £100, (2) all private building work (other than housing) carried out under a maintenance licence, (3) building contractors' plant.

Applications for timber licences in connection with (1) and (2) should be made to the appropriate Regional Licensing Officer of the Ministry of Works. Timber licences for all housing work will be issued by the Ministry of Housing and Local Government.

Where timber for work under £100 has previously been issued by a Government Department other than the Timber Control the existing arrangements will not be affected.

Applications for timber for item (3) should be made to Ministry of Works (A.S.72), Lambeth Bridge House, London, S.E.1. (MOW/29/52. P.I.80. 26 March.)

PLANNING DECISION. Ancient Lights. Screen to prevent acquisition. The Dorking Urban District Council refused to permit the retention of a timber screen which was put up to protect the applicant's property against the eventual acquisition of ancient lights by the owner of the adjoining property. The ground of the refusal was that the screen would seriously interfere with the amenities of adjoining property.

In allowing an appeal against the refusal the Minister of Housing and Local Government indicated that it would be inappropriate to allow planning control to be used in such a manner as to deprive the appellant of such rights as he may have at law in a matter of this nature, unless some over-riding planning objection was involved. The Minister did not think that the effect of the screen on the amenities of the neighbourhood was such as to justify a refusal of permission for its retention, and since he was of the opinion that no other planning consideration was in issue, he decided to allow the appeal. (THE JOURNAL OF PLANNING LAW. March 1952.)

ARCHITECTS' REGISTRATION COUNCIL. The Annual Report of the Council for 1951 has been published, and under the heading of Professional Conduct are the following:

The Council have considered whether it is appropriate for an architect to seek to be placed upon a panel of architects maintained by a local authority or to enquire whether a local authority maintains such a panel. The Council are of opinion that an architect should not do so in order that there may be no suspicion of touting for business, but should seek guidance and information from the local society of architects in the district concerned.

The Council have considered a complaint that an exhibition advertised in the press was held to illustrate the work of two architects. The Council consider this to be a means of advertising and not permissible.

The question has been raised whether an architect may allow his name to appear in the classified list of members in the Year Book of a Chamber of Commerce arranged according to trades and professions. The Council are of opinion that for an architect to allow his name to appear in a published list of architects restricted to members of a Chamber of Commerce would be tantamount to advertising, and is therefore not permissible.

R.I.B.A. STANDARD FORM OF CONTRACT. Practice Note No. 29 issued by the Joint Contracts Tribunal. It has been brought to the notice of the Tribunal that it is not an uncommon practice for parties signing the R.I.B.A. Standard Form of Contract to include against the item in the Appendix 'Limit of Retention Fund' a percentage instead of an amount in pounds. Attention is therefore directed to Clause 24 (*c*), which reads as follows:

'(*c*) The amount which may be retained by the Employer in virtue of this clause shall be the percentage of the value of the work and materials aforesaid which is named in the appendix as Percentage of Certified Value Retained and up to the amount there named as Limit of Retention Fund (which in neither case shall exceed 10 per cent). Provided that where the limit named in the appendix or the limit reduced in pursuance of clause 21 of these Conditions, as the case may be, has been reached, the full value of the work and materials shall be certified by the Architect.'

The Tribunal therefore advise that the provisions of the above clause call for the inclusion against the item 'Limit of Retention Fund' of an agreed sum of money proportionate and appropriate to the value of the contract works.

Nominated Sub-Contractors. Statutory Undertakers. The Tribunal have been in communication with Electricity Boards in connection with work performed by them under clause 3 of the R.I.B.A. Form of Contract and work carried out by them as nominated sub-contractors under clause 21. The following Boards agree that when carrying out work under clause 21 they are not in any different position from a private firm doing the same work, and therefore 2½ per cent cash discount will be allowed to the main contractor. In inviting tenders the architect must make it clear that the work being tendered for is to be carried out under clause 21 so that the Boards can deal with the cash discount in submitting their tenders. The list of Boards is as follows: Southern Board, North Eastern Board, Midlands Board, Yorkshire Board, South Eastern Board, South West Scotland Board, South East Scotland Board, London Electricity Board.

Replies have still to be received from the South Western, South Wales, East Midlands, Eastern, Merseyside and North Wales, and North Western Boards.

The Commercial Managers' Committee of the Gas Council have expressed the opinion that, in general, Area Boards do allow the discount under clause 21, but that any negotiations in respect of a specific case should be conducted direct with the Area Board concerned.

LAW CASES. Claridge and Hall Bros. v. Fisher. Queen's Bench Division, 21 March 1952. This was a claim by the Plaintiffs, builders, for £469 4*s*. 5*d*., being the balance of an account of £1,865 4*s*. 5*d*. for building a house for the Defendant. The amount authorised by the building licence was £1,405, and the Defendant refused to pay anything over that amount on the ground that such payment would be illegal.

Judgment was given for the Plaintiffs for £137 10*s*. 10*d*. and costs. This amount was made up of items in the account which the Judge held did not require a licence, i.e. curtain rails, book shelves, clothes posts, and other articles regarded as furnishings rather than integral parts of the building. Further items allowed by his Lordship were increased labour costs, immersion heater, garden paths, wheel tracks to garage, levelling the garden and the front boundary wall. The charges for abnormally deep foundations and wood block flooring were not allowed. (THE BUILDER, 28 March 1952.)

Amalgamated Building Contractors Ltd. v. Waltham Holy Cross U.D.C. Queen's Bench Division, 12 March 1952. This was a claim by the Plaintiffs for £3,293, being the balance of a contract to build 202 houses, the date of completion being February 1949. The Defendants admitted the claim, but counter-claimed £3,350 damages under a penalty clause for delay in completing the contract.

Plaintiffs' case was that the architect was empowered to grant extensions of the contract time, and because of labour and material shortages they applied for an extension. This was not granted, and it was impossible for them to complete by the contract time. The contract was completed in August 1950.

The Defendants said that the contract was not completed until October 1950. Plaintiffs were given an extension of fifteen weeks in December 1950, i.e. from February 1949 until 23 May 1949. It was argued that this was not an extension as it was retrospective.

His Lordship, in giving judgment, said he could not find anything in the agreement which said the architect had to award a prospective date when granting an extension. He was satisfied that the Plaintiffs received the extension of fifteen weeks. They had asked for an extension, and the architect had considered that fifteen weeks was a just extension. His Lordship found that the architect had exercised his right in law as he was properly entitled to do.

The Plaintiffs' claim was dismissed and judgment entered for the Defendants for £57—the difference between £3,350 and £3,293. A stay of execution was granted on condition that the Plaintiffs paid the £57 and £100 into court. (THE BUILDER, 21 March 1952.)

(It is understood that the contract was the R.I.B.A. Form of Contract and that the Plaintiffs will appeal.)

Book Reviews

Nottinghamshire, by *Nikolaus Pevsner*. (The Buildings of England *series*, BE2). 7¼ in. + 248 pp. incl. map + 64 pls. Harmondsworth: Penguin Books. 1951. 3*s*. 6*d*.

This book is the second of a new Penguin series which will eventually include every English county. The publishers are to be congratulated on producing so inexpensively a guide which includes 200 pages of text, 64 illustrated pages and a layman's glossary.

After a short but pithy introduction giving a general description of the county, the survey is divided alphabetically by towns and villages. Emphasis appears to be on ecclesiastical architecture, though domestic and public buildings are briefly described. The map, gridded for locational reference, is not of much use, and the photographs are of only average quality. In a volume of this size illustrative selection has to be strict, but if the twenty photographs of church monuments and effigies had been reduced and the dozen photographs of domestic architecture thereby increased, room would have been available for illustrations of the attractive Georgian dwellings in villages such as Car Colston, East Bridgford, Epperstone, Linby and elsewhere.

The descriptive text, however, is critically well balanced, and the author's brevity and accuracy in his pictorial summaries are most refreshing, e.g. Caunton Church 'prettily placed by a little stream with a footbridge over, and a good, rewarding village church neither over restored nor neglected', or his comments on S. S. Teulon at Bestwood Lodge . . . 'one of the most ruthless, insensitive and original of the High Victorians.' Up to now Dr. Pevsner is best remembered in Nottinghamshire for his sensitive and scholarly publication of *The Leaves of Southwell*, but in this

Buildings of England publication the architectural history of the whole of Nottinghamshire has to be abbreviated into 200 pages. Somehow he has accomplished it without giving the book the flat uncritical judgment one finds in the normal 'guide to tourists'.

The author has appealed for errors or omissions and, considering the vast compilation of historical and archæological facts, there appear to be relatively few. On p. 161 the statement that Southwell is not a cathedral town and was only raised to cathedral rank in 1884 is incorrect. The see was certainly created in 1884, but Southwell, since it possessed a Bishop's throne, was *always* a Cathedral. On p. 170 the comment that 'little remains of the original character' of the sedilia after Bernasconi's restoration in 1820 is questionable. In drawings executed prior to 1820 the character is very much the same. On p. 171, (*a*) under furnishings, royal arms are omitted in the text—James I but altered to 'C.R.'; (*b*) candlesticks were *not* with the lectern thrown in the lake. They belonged to Southwell always; (*c*) for 'Prior' read 'Archbishop'; (*d*) Archbishop Sandys—there is no reference to the very remarkable and detailed life history of the Archbishop written in Latin on the west side of the monument. On p. 172, Bishop Ridding is by Pomeroy *not* Caroe. Another omission is Hoskyns, who deserves a mention.

Under modern architecture, Dr. Pevsner considers the Boots factories at Beeston to be the only buildings worth recording. These factories are basically well planned and their bold construction was a stimulus to architecture in the 'thirties, when most of our profession were still borrowing fancy-dress façades, but one must be careful not to romanticise engineering which is lacking in architectural quality. Here many of the details are crude and the finishings coarse. There is nothing exceptional about double cranked-beam construction even on this scale, and architecture does not begin and end with the span or length of cantilevers. The merits of these Boots factories are their functional planning and their engineering sincerity, but it would be wrong to become sentimental merely because they lack sentimentality.

C. ST. C. OAKES [*F*]

An Inventory of the Ancient and Historical Monuments of the City of Edinburgh, &c., by the *Royal Commission on the Ancient Monuments of Scotland.* 11 in.×8½ in. lxxix+289 pp.+front.+154 pls. text illus. Edin.: H.M.S.O. 1951. £2 5*s*.

This, the thirteenth Report of the Royal Commission on the Ancient Monuments of Scotland, is the first to deal with a city as distinct from a county area.

Edinburgh has been rightly chosen for this distinction, since it possesses by far the greatest number of buildings of historical and architectural interest remaining in any town in Scotland. Profusely illustrated and with a great number of plans and drawings, the book is quite indispensable to anyone concerned with the development of the city, and is of vital concern now that today we are faced with the problem of Edinburgh's future growth.

In addition to a list of buildings of exceptional worth recommended for special consideration, the inventory covers some two hundred and fifty items, and in the introduction provides what is surely the most compact and informative history of the city's development from the earliest times to the Industrial Revolution ever to be written. The book's value has been further enhanced by the inclusion of many buildings of later date than 1707 (the previous limit set to such inventories), the period up to 1815 being treated also. It is a pity that still later buildings have not been covered. Apparently the work was in the press when, by Royal Warrant, it was decreed that such buildings could be included. One further point of criticism should be made here with regard to the photographs. While many of these are admirable, some are not of as high a standard as one could have wished. This applies more particularly to the exterior views, such important monuments as the Castle and Holyrood Palace suffering in this respect. One has become so used to the high æsthetic excellence of architectural photography today that it is disappointing to have to criticise the book on this score.

It is seldom realised that so little mediæval work is left in Edinburgh. No houses at all remain from this period, the greater bulk of the buildings of the Royal Mile dating from the 18th century or later. It is good therefore to see such attention paid to the development of Edinburgh's New Town, begun in 1767, which shares with the historic centre the honour of making Edinburgh one of the most beautiful cities in the kingdom. London excepted, Edinburgh in the 18th and early 19th centuries produced work second only to Bath in charm and extent.

The book is provided with copious references and a glossary of technical terms which should render its erudition easily assimilable by the most uninformed reader. For the expert it is invaluable, a veritable monument in itself. Lastly, the cost for such a work is by no means excessive, and the Stationery Office deserve all praise for such a handsome production.

ALAN REIACH [*A*]

The Painters of Ferrara, by *Benedict Nicolson.* (Master painters *series*, ii.) 14¾ in. 21 + (i) pp. + (19) + 12 pls. Elek. [1950.] £2 2*s*.

This is the second volume in the *Master Painters* series (the first by F. J. B. Watson on Canaletto was published in 1949) and its addition to the literature (in English) on the history of painting in Northern Italy is important.

The schools of Bologna and Ferrara, which flourished during the second half of the 15th century and produced such distinguished names as Cosmè Tura, Francesco del Cossa and Ercole de' Roberti, have long been neglected in this country, although the three most notable painters of the School are all represented in the National Gallery and the text of Mr. Nicolson's book can now be read in conjunction with the recently published National Gallery catalogue of *The Earlier Italian Schools* by Martin Davies (published at 8*s*.). The neglect of this important school may be due to its comparative isolation from the general flow of development in Tuscany and by the overpowering achievements and outstanding personalities which Florence produced. The present renewed interest in Piero della Francesca, however, whose influence on the Ferrarese was considerable, may do much to revive interest in the painters of the elegant allegories and frescoes which decorated Count Borso's pleasure-palace of Belfiore and his Palazzo Schifanoia, as well as in the great altarpieces from San Giorgio fuori le Mura, Ferrara (Cosmè Tura), San Petronio, Bologna (Cossa) and San Lazzaro, Ferrara (Ercole).

The value of the book is hardly enhanced by the inclusion of 12 costly and elaborate coloured plates. One could wish that more monochrome reproductions of the works mentioned in the text, and especially of those not in this country, had been substituted.

P. H.

Die Fenster der Kleinwohnung. 34 pp. + pls. + folding pl. **Die Türen der Kleinwohnung.** 16 pp. + 67 pls. + folding pl. Each by *Heinrich Rettig.* (Die Fenster und Türen der Kleinwohnung.) 11¾ in. Munich: H. Rinn. (1949.)

These volumes are monographs on doors and windows for housing schemes. The proven standard constructions can not be repeated in a cheaper version, dimensions can not be reduced or standards lowered in order to provide suitable joints, fixings or fittings for the low-cost housing programme. Low cost doors have to be designed for their particular requirements.

Doors: There are two types of doors that can be made up in the joiner's shop and that can be fixed in one operation, so that the joiner does not have to come back to the job after the plasterer, nor the plasterer after the joiner, in order to make good. While there are only two details that meet all requirements among a large number of examples, the twenty pages of text are written with such detailed knowledge of the snags that I for one am going to study the two recommended solutions with some care.

Windows: The volume on windows is perhaps the more important. Windows are more expensive than wall surfaces, and they are a frequent source of trouble and maintenance costs. We may have to forgo any detailed criticism of the windows we are forced to use in this country, whether metal or wood, because we won't get anything else, but the methods of fixing and the type of fittings are still somewhat vague and left to the architect's discretion. There are some sound opinions given about the size of windows and their placing in a room. 3 ft. 6 in. by 4 ft. 6 in. is considered, from experience, to have proved itself adequate for rooms of about

150 sq. ft., provided the windows are well placed and the depth of the rooms is not greater than 14 ft. Full details are given of those windows that are recommended, and it is good to see that windows can be detailed to meet without a fixed meeting stile, and that each casement can be over 2 ft. wide without making unreasonable demands on the timber. All corners, however, are reinforced with sheet metal corners, and on the hinge side these reinforcements are made in one piece with the hinge. This is the standard construction in many countries, and I still have not discovered why we have to rely on the weak timber joint alone. There are some fine details of French doors and of ventilating frames inset into fixed lights, all much more slenderly detailed than is common. Yet I trust the author to know how far he can go.

Like all the construction books that have come out on the Continent since the war, Rettig's books never lose sight of design. It seems so obvious and essential that a detail should be able to be used as it is drawn, and does not have to be redesigned by the architect who uses it. These books may have their faults—and the chief fault is to waste so much time on details that are not thought good enough by their author; but they do give us the whole job fully considered—æsthetically, socially, economically, structurally and practically. G. ROSENBERG [4]

Hospitals: Integrated Design, by *Isadore Rosenfield.* 2nd ed. 11¾ in. 398 pp. incl. pls. text illus. New York: Reinhold. 1951. (£6.)

Text books on hospital planning grow out of date very rapidly owing to the swift development of medical practice. To meet this the author and publishers of Isadore Rosenfield's textbook arranged to make revisions at regular intervals of five years. In fact, however, this second edition has come out 2½ years after the original, and it has already been found necessary to make widespread changes. The fluid quality of hospital design is stressed by the author, and one of the merits of the book is that it nowhere attempts to lay down ideal solutions or to put forward final conclusions. It is therefore a most interesting, stimulating and readable work. Not the least of its merits is that the author's enthusiasm for improving the hospital service and bringing the modern approach to architecture to bear on hospitals is so apparent in every line. It is quite an achievement to convey this sense of excitement and enthusiasm in the pages of a text book.

Perhaps the weakest part of the book is the first section, in which the methods of estimating hospital requirements in terms of beds per head of population and the integration of hospitals are discussed. This is not the author's fault—there is very little available knowledge on these subjects anywhere. But American material is well presented in the book.

The sections devoted to planning deal, of course, mainly with American conditions, which are different in important respects from those operating in Europe. Nevertheless, they are of considerable interest, particularly where, as in the case of wards, analytical comparison is attempted between different plans. In dealing with the various departments, considerable use is made of the type plans issued by the United States Public Health Services, to which the author gives general approval. Many modern American plans are also illustrated.

The last section of the book deals with certain special problems, such as daylighting, artificial lighting, construction costs and mechanical plant. Here again, the tone is that of stimulating discussion rather than of conclusive recommendations. In some of these fields we may perhaps feel that we are at least abreast of the United States in our current research.

R. LLEWELYN DAVIES [4]

Damage Control in War-time, by *M. C. Neuhoff. National Industrial Conference Board* (New York). (Studies in business policy, No. 53.) 11 in. × 8½ in. 82 pp. text illus. New York. [1951.] 83.

Protecting Personnel in War-time, by *R. M. Ballinger.* ([Same.]) ([Same], No. 55.) 11¾ in. × 8½ in. 124 pp. text illus. New York. [1952.]

During the war the measures taken to provide defence against the effects of bombing in factories and key points were subject to official secrecy; since the war, very little information on what in time became an elaborate technique has been published. Now, the National Industrial Conference Board of the U.S.A. have published a fairly full account of the measures taken, principally those in Great Britain and Germany. The authors consulted many public bodies and industrial firms, including the R.I.B.A., in obtaining their material. They suffer from some disadvantage in not having had practical experience of the technique and thus are not always able to evaluate the different methods but, on the whole, these books are accurate, thorough and informative. It may be argued that they are concerned with fighting the last war, and that the atom bomb has rendered them obsolete; but against that it can be said that, while the weapons against which defence will be required have enormously increased in power, the principles in general remain effective. For example, dispersion, fire protection, the framing of buildings and the existence of an efficient defence organisation are still important elements in providing shelter and maintaining production under war conditions. E. L. B.

Möbel, by *Karl Nothhelfer.* 11½ in. 207 pp. text illus. Ravensburg: O. Maier. 1950. DM36.

This impressively produced book, printed on art paper, illustrates with excellent photographs and detail drawings, supported by brief descriptive notes, some four hundred pieces of furniture of conventional use. All have apparently been designed by Karl Nothhelfer, a consummate craftsman in furniture construction, whose precepts have considerably influenced furniture makers in Germany for a number of years. Opening this volume at any page, one enters immediately the solid, orderly homes of the German business and professional classes. None of the objects depicted are unpleasant, but few reveal any qualities except a high standard of workmanship, and hardly any will be remembered after the pages have been turned. Seldom has the distinction between the craftsman and the artist been more graphically (though, alas, unconsciously) displayed. The book is intended to be complementary to the author's earlier work, *Das Sitzmöbel,* an exhaustive analysis of chair design and construction, but it is unlikely to enjoy a comparable reputation with readers in this country. J.C.P.

The Specialty Shop (a guide), by *José A. Fernandez.* 11 in. × 8½ in. 304 pp. text illus. New York: Archl. Book Pubg. Co. 1950. £4 2s.

In his foreword, Leopold Arnaud, A.I.A., Dean of the School of Architecture, Columbia University, quoting the familiar saying 'If a man builds a better mousetrap, the world will beat a path to his door', adds the comment 'It has not always been so well understood that still more people will buy these mousetraps if the box and place are efficiently and effectively designed'.

Here is a book packed full of examples of the finest contemporary shops in the United States. It provides the reader with ample evidence of the specialty type of store as well as a vivid insight into American store planning generally. As in this country, the American specialty shops, in their efforts to meet the competition of the larger stores, have led the way in design.

Primarily a picture book, showing with great pictorial eloquence the progressive outlook, hardly to be paralleled elsewhere, of many American shopkeepers, this volume is also most informative in its text and, in particular, in the excellent collection of detail scale drawings of fittings, the study of which should prove invaluable to architects and designers.

The book follows a logical pattern. It begins with a brief glance at the history of retail merchandising, after which the major elements of store design—frontage, signs, awnings, interiors, staircases, floor coverings and furnishings, lighting, colour, display and concealed functions—are each carefully discussed and profusely illustrated with well chosen examples from each phase of the design problem.

The author—perhaps the leading store architect in his country—submits that the real problem is the successful joint planning of a new store by the client and his architect, and he sets out to show how such collaboration can be managed. Writing more for the layman than the architect, he clearly achieves his aim, although architects would have welcomed still more technical and constructional data. All types and sizes of shop are, however, included, from the 'littlest' shop of all, the Gotham Hosiery Shop in New York, to the spacious

and dramatic Ansonia Shoes, Philadelphia. There is already evidence that shopkeepers in this country have begun to move in a similar direction, even though current restrictions force the wheel to turn more slowly, and we would be wise to keep a watchful eye on the American trend. *The Specialty Shop* is a stimulating contribution to our study and appreciation of this exciting subject. ELLIS SOMAKE [F]

South Bank and Vauxhall. The Parish of St. Mary, Lambeth, Part I. (Survey of London, vol. xxiii.) *London Survey Committee* and *London County Council*. 12 in. × 10 in. xxiv + 170 pp. + front. + 127 pls. text illus. 1951. £1 10*s*.

More than 50 years have passed since the London Survey Committee, with the backing of the London County Council, began to record systematically the topography and buildings of London. During that time 23 of these precious volumes have appeared, together with 15 monographs on particular buildings. The present work, written by Miss Ida Darlington, adequately maintains the high standard of the series and, with masses of new matter based on original research, numerous measured drawings and reproductions of little known prints, recreates the growth of North Lambeth for us.

From one angle it is fortunate that work on this area has been delayed until now, for earlier volumes were conditioned by acceptance of the date 1714, which was formerly imposed on the Royal Commission on Historical Monuments, and which, in parishes with much early material, was not a serious hindrance. This area, however, was largely developed after the middle of the 18th century and so the adoption of a limiting date of 100 years ago makes an adequate study possible.

The building of Westminster Bridge had a vital effect on the growth of inner South London. It was followed immediately by the construction of Westminster Bridge Road, Kennington Road and others under Act of Parliament, and for the next 100 years dignified terraces of comfortable houses, with fine doorcases, balconies and railings and internally provided with good staircases and joinery and marble chimneypieces, spread steadily southwards along these new main roads. Smaller but still pleasant houses covered the back land. It is with this great housing development that this book is in the main concerned.

Of course, we are given glimpses of the earlier village of Lambeth and of Lambeth Palace and the rebuilt parish church of St. Mary, but much of this has been told elsewhere and is not to be compared with the Georgian story. For example, Chapter 15 on Coade's artificial stone works is a triumph of patient investigation.

One regrets that there is no reference to the architectural firm of Middleton and Bailey of Paradise Row, with whom Sir Chas. Barry was articled for six years of such happy memory that he named his second son Edward Middleton Barry. The careers of two Middletons have become entangled. Space does not permit of a detailed examination of the facts here, but it is probable that Charles was an architect, while John was certainly bailiff to the Archbishop of Canterbury and Land Surveyor to the Prince Regent. The works of the firm are not inconsiderable and are set out in *The Dictionary of Architecture*. What is perplexing is the relationship of John to Charles.

One would also like to know something about the gentleman who is described on two Lambeth penny tokens of 1796 as Sir George Cook, Mayor of Garratt, Fruiterer, Greengrocer and Oyster Merchant, Stangate, Lambeth. W. W. BEGLEY [L]

Chatsworth: A Short History, *etc*., by *Francis Thompson*. 8½ in. 127 pp. incl. pls. text plans. Country Life. 1951. 9*s*. 6*d*.

Mr. Francis Thompson has already put students of English art and architecture in his debt with his *A History of Chatsworth*. The present volume is in essentials a shorter version of that important work—45,000 words as against 110,000, on a rough computation—intended for members of the general public, who visit Chatsworth at the rate of some 15,000 a summer. With a proper sense of audience, Mr. Thompson has included several anecdotes, entertaining in themselves, that would have been out of place in the larger volume; but he never 'writes down', and the most learned should be able to read him with pleasure.

For new material relating to the architectural history of the great house one does not look. Nevertheless, on page 59 there is a reference to 'the recently discovered possibility that [Sir James] Thornhill was responsible for the design of the . . . west front', which may well puzzle readers of Mr. Thompson's earlier book. Since the suggestion that Thornhill designed this front was made by the present reviewer in an unprinted broadcast, a brief résumé of the supporting evidence may be not unwelcome here.

One of the most interesting results of Mr. Thompson's researches, it will be remembered, was the discovery that contrary to previous belief the west front of Chatsworth—in effect the principal front—cannot have been designed by William Talman. Who did design it? Mr. Thompson suggested that the choice lay between John Fitch, who in 1700 contracted to build it, Thomas Archer, and the Duke of Devonshire himself. However, the engraving of the front in Campbell's *Vitruvius Britannicus* is inscribed, in the left bottom corner: *Ex Authographo. D. I. Thornell.* 'Authograph' being a mis-spelling of 'autograph' noted in the *O. E. D.*, there can be no doubt but that the general purport of this inscription is that the engraver worked from an original drawing by one Thornell. Now there is more than one instance of Thornell being used as an alternative spelling of the name Thornhill in the 17th and 18th centuries; moreover, as Mr. Colvin has informed me, the surname of Sir James himself was spelt thus by the Radcliffe trustees when considering him as a possible architect for the Library at Oxford. The *I.* can then be read as the initial letter of *Iacobus* (or perhaps of the genitive, *Iacobi*), for James; the precise meaning of the *D.* is an open question, though it is safe to say that nothing is less likely than that it should stand for another Christian name in an age when the possession of two Christian names was so very rare.

If one accepts the theory that this inscription on the *Vitruvius Britannicus* plate shows that Thornhill was responsible for more than murals and painted ceilings at Chatsworth—an admitted difficulty is that Campbell himself apparently did not know it—one may recognise corroborative evidence in a painting, now in the theatre there, which depicts an alternative design for the west front; although the documentary evidence, so far as it goes, suggests that Louis Chéron was the artist, it is conceivable that this was painted by the young Thornhill to draw the Duke's attention to his skill in architecture, the later specimens of which were to include a design for Blandford Town Hall, his own house in Dorset, and perhaps Moor Park in Hertfordshire (the attribution of which to Leoni has few visible means of support). That the authorship of a work of the importance of the west front of Chatsworth should still be doubtful after the attentions of so thorough a scholar as Mr. Thompson shows how far we still are from that state of knowledge in which a definitive history of English architecture could be written.

MARCUS WHIFFEN

Landscape Architecture. *Lester Collins* and *Thomas Gillespie*, eds. Harvard University, Graduate School of Design, Department of Landscape Architecture. 74 pp. incl. pls. text illus. Cambridge, Mass. [1951.] $2.00.

The Department of Landscape Architecture at Harvard recently celebrated its fiftieth anniversary with an exhibition of models, drawings and photographs of the works of graduates. This was followed by the publication of a slim well-produced booklet, showing a number of schemes chosen from the exhibition.

The illustrations, however, do not form a brief review of landscape design throughout the past fifty years, as might have been expected. The choice has been limited to examples of contemporary design. It seems a pity that the opportunity of presenting an outline of the development, and of revealing the influence, of the Department for half a century has been missed. Since this is the oldest school of landscape architecture, a comprehensive summary of its achievements is all the more desirable. A few details of the history of the Department itself would also have been welcome.

The plates are interspersed with short comments contributed by members of the staff, from which something of their points of view and of the scope of the syllabus may be learned. The introduction by the Dean of the Graduate School of Design is followed by notes on plant materials, colour and foliage, abstract art, federal housing administration and the work at the field laboratory.

It is to be hoped that the success of this souvenir will encourage those concerned to consider the possibilities of a larger publication. PATRICK HORSBRUGH [A]

Bristol, by *Tudor Edwards*. (British Cities *series*.) 7¼ in. 96 pp. incl. map + pls. Lond., etc.: Batsford. 1951. 9*s*. 6*d*.
This is an excellent handbook on Bristol. Though not apparently a Bristolian by birth, Mr. Tudor Edwards has thoroughly absorbed the history of the city he has adopted and he fully appreciates the *genius loci*. His record of the achievements of Bristol might surprise even a Bristolian—the construction of the first Methodist chapel in the world, the first free library and the first savings bank in the kingdom, the first workhouse established by Act of Parliament in England, the first American consulate in England, the first bank in the provinces, and the first provincial newspaper, the first steamship in the world planned and built in the city; while the Great Western Railway was almost wholly a Bristol project.

The story of Bristol flows easily from this author's pen. First, Mr. Edwards gives a description of mediæval Bristol, the city churches, the walled town, the ships and explorers, the prosperous merchants; then come chapters tracing the city's rich architectural heritage through the early Renaissance, Georgian and Regency periods to the Victorian aftermath. The architectural record is written with knowledge and discrimination, avoiding the dull guidebook recital of facts and dates by a skilful sequence and order, so that one building leads on to another and each is shown against the background of the social, cultural and economic conditions and the craftsmen that were responsible for its production. It is difficult to find fault with Mr. Edwards in his assessment and description of buildings of architectural merit, and he displays much erudition in the references, both literary and historical, with which he enlivens his text.

The literary style is somewhat precise and dry, but the interest of the narrative is sustained by the keen enthusiasm that the author obviously has for his subject. The text is illustrated by some 50 excellent photographs.

Altogether this is one of the most intelligently written short monographs one has read upon a city which, as Mr. John Summerson has said, 'has developed in all directions, and where nearly everything has happened'. EUSTACE H. BUTTON [F]

Valuation for Compensation and Development Charges, by *Ronald Collier*. Supplement. 9½ in. viii + 105 pp. Butterworth. 1951. 15*s*.
The Supplement deals with the problems arising from the publication of the Planning Payments (War Damage) Scheme and from official statements regarding claims for loss of development rights on land 'held with' other land. It incorporates the principal variations in practice and procedure which have occurred since the main volume appeared in 1948.

Highway Engineers' Reference Book, *&c*. 1950-51. *Edward Stead*, ed. 10½ in. × 8 in. xi + 464 + secl. pp. text illus. Newnes. 1950. £2 5*s*.
This is the standard reference book for those concerned with road construction. It covers every stage of the subject from legal aspects, surveying and design, to lighting, traffic control and maintenance.

Spon's Architects' and Builders' Price Book. *Davis, Belfield and Everest*, eds. 77th ed. (1951-52.) 6½ in. 585 pp. Spon. 1951. 18*s*.
The new edition is similar to the last, but a section has been introduced containing 'constants' of labour and materials for all the more important items, for which prices are given later under the heading of measured work. The practical value of this book to all connected with the building industry needs no emphasis.

Principles of Quantity Surveying, by *Reginald D. Wood*. 2nd ed. 8½ in. 719 pp. + folding pls. text illus. ESTATES GAZETTE. 1951. £2.
The new edition of this sound textbook, which first appeared in 1948, contains two additional chapters, dealing with Internal Deal Staircases and Internal Plumbing. In other respects it is largely a reprint of the original work.

Fenster, *etc*., by *Alfonso Juan Wacker*. 2nd ed. 9½ in. 70 pp. + pls. text illus. Buenos Aires: Mercur. 1950.
The first edition of this brief study of the development and use of various types of window was published in Germany in 1938. The new version (largely a reprint of the earlier book apart from the addition of a few new plates) comes from the Argentine, where its author, an architect, is now in government practice. Spanish and English translations are promised, as is a far more comprehensive work by Dr. Wacker on the same subject now in course of preparation.

Painting and Decorating, by *D. W. Marshall*. 8¼ in. 80 pp. incl. advts. + (4) pls. text illus. Illusd. Carpr. & Br. 1951. 3*s*. 6*d*.
The text is based on a series of articles which appeared in the *Illustrated Carpenter and Builder*. The material has been revised and expanded for publication in this small book.

Trade Marks and Industrial Designs, etc., *cover title*. Presidential address to the R.I. Scottish Socy. of Arts, by *C. G. A. Yate Johnson*. 8¼ in. 30 pp. incl. pls. + pl. Edin.: Johnsons. 1950. 2*s*. 6*d*.
A reprint of the author's Presidential Address to the Royal Scottish Society of Arts.

An Example in Builders' Estimating, etc., by *R. G. Bailey*. 9¼ in. 29 pp. Crosby Lockwood. 1951. 3*s*. 6*d*.
A useful guide which explains how to estimate a unit price of any item in a bill of quantities when the labour constant and the material required have been calculated by reference to the *A.B.C. of Builders' Estimating* (compiled by the same author).

A Walcot Exhibition in Chicago

The Department of Art of the University of Chicago have recently staged an exhibition of prints by William Walcot. This fact may come as a surprise to those who have hitherto regarded Walcot as possessing a purely British reputation. In 1944 the Royal Institute held a memorial exhibition at which those of his works—mostly gouache and watercolour paintings—which could then be collected in this country, were shown; but it seems that discerning American collectors possess a large number of his etchings and that he is beginning to enjoy something of a vogue outside this country.

In the catalogue of the Chicago exhibition Mr. Ulrich Middeldorf writes: 'With the death of William Walcot in 1943 there disappeared one of the last of the long series of artists who were characteristic of English printmaking since the 18th century. He belonged to a tradition of draughtsmen who developed admirable and often new techniques for rendering reality in a faithful manner, with aims almost forgotten by the present world. English concern in architecture as a humane and as a cosmopolitan art was developed in him to a degree found in few of his contemporaries. As for many Englishmen of his kind, architecture for Walcot was not only the building to be erected but the building of the past or present or future to be enjoyed, to be studied, to be savoured with the full flavour of its surroundings, its history, its associations with life. Architecture to him was the pivot of a rich life's complete experience.

'Walcot's works show the accuracy of the architect and at the same time the delicate touch of the painter. The buildings are rendered as neatly as on the draughting-table, but never pedantically. At times they are flooded in light, at times submerged in mists; usually they are enlivened by fleeting impressions of daily life, by the fluttering twigs of trees or shrubs; they are part of a whole. Everything is seen with a keen eye and rendered with a firm hand, in a refined, delicate technique which leaves nothing to accident. His watercolours are subdued in tone, judiciously touched here and there with a brighter accent. The sobriety and the objectivity of Walcot's work stem from a profound seriousness and honesty of mind.'

The many British admirers of Walcot's work will appreciate the justice of Mr. Middeldorf's appreciation and rejoice that his fame has spread abroad.

Notes and Notices

NOTICES

The One Hundred and Fourteenth Annual General Meeting, Tuesday 6 May 1952 at 6 p.m.

The one hundred and fourteenth Annual General Meeting will be held on Tuesday 6 May 1952 at 6 p.m. for the following purposes:—

To read the minutes of the Fifth General Meeting held on 4 March 1952; formally to admit new members attending for the first time since their election.

To receive the Annual Report of the Council and committees for the official year 1951-1952. (Copies of the Annual Report were sent to members on 22 April.)

(Note: It will facilitate answers to questions if members will give the Secretary prior notice of any questions which they may wish to ask. Notices should be in the Secretary's hands not later than 28 April. This will not preclude the right of members to ask questions on the Annual Report without having given prior notice.)

To nominate candidates (two members) for the office of Hon. Auditors for the ensuing year.

(Light refreshments will be provided before the Meeting.)

Lecture on 'Italian Architecture', Monday 28 April 1952 at 6 p.m.

On Monday 28 April at 6 p.m. Mr. G. E. Kidder Smith will lecture on 'Contemporary Italian Architecture and the Italian Heritage'. The Exhibition of Italian Architecture will remain open in the Florence Hall until 30 April.

R.I.B.A. Kalendar

The next issue of the Kalendar will be published in the autumn and members and Students wishing to notify new addresses, etc., for publication in the new Kalendar should do so as soon as possible. The last date for receiving changes for inclusion in the new Kalendar will be 31 May for those in the United Kingdom and the Republic of Ireland and for those overseas the last date will be 30 June.

R.I.B.A. Reception, Friday 23 May 1952

The R.I.B.A. Annual Reception will be held on Friday 23 May 1952 from 8.15 p.m. to midnight. The President and Mrs. Henderson will receive the guests in the Henry Florence Hall from 8.15 p.m. to 9 p.m., and there will be dancing from 9 p.m. until midnight.

Tickets are 15*s.* each, and applications accompanied by the necessary remittance should be made to the Secretary, R.I.B.A. Payment must be made by crossed cheque, money or postal order. Evening dress will be worn.

Annual Subscriptions and Contributions

Members' subscriptions and Students' contributions for 1952 became due on 1 January. The amounts are as follows:

	£	*s.*	*d.*
Fellows	7	7	0
Associates	4	4	0
Licentiates	4	4	0
Students	1	11	6

For members resident in the trans-oceanic Dominions who are members of Allied Societies in those Dominions, and for members resident overseas in areas where no Allied Society is available, the amounts are as follows:

	£	*s.*	*d.*
Fellows	4	4	0
Associates	3	3	0
Licentiates	3	3	0

British Architects' Conference, Edinburgh, 1952

All members and Students of the R.I.B.A. and all members and students of the Architectural Association and the Allied Societies are cordially invited to attend the Conference to be held in Edinburgh from 25 to 28 June. Full particulars and the application form were enclosed with the March issue of the JOURNAL. Applications should be sent in to the Secretary R.I.B.A. *not later than* 30 *May*.

The hotel accommodation which was provisionally reserved through the Royal Incorporation of Architects in Scotland can no longer be held, but members must now reserve their own accommodation direct with the hotels.

BOARD OF ARCHITECTURAL EDUCATION

R.I.B.A. Prizes and Studentships, 1952-53

The R.I.B.A. Prizes and Studentships Pamphlet for 1952-53 is now available and can be obtained at the R.I.B.A., price 2*s.* 6*d.*, postage 3*d.* extra. The pamphlet contains full information upon the various prizes and studentships, together with, where applicable, the detailed programmes for the competitions.

The Examination in Professional Practice and Practical Experience, March 1952

The Examination in Professional Practice and Practical Experience was held in London on 3 and 4 March 1952. Of the 62 candidates examined, 52 passed and 10 were relegated. The successful candidates are as follows:

Adlam, Thomas E. R.	Hall, Thomas
Arnold, Donald J.	Hanson, John
Attridge, Ralph	Hargreaves, Robert D.
Bowman, Edward	Haynes, Geoffrey H.
Brimley, Leonard W.	Henley, Robert H.
Burn-Hill, Anthony S.	Hill, Derek B.
Carn, Ronald E.	Holt, Colin
Carron, Samuel	Karpinski, C. J.
Chapman, Laurence R.	Kennedy, Warnett
Clothier, Leonard E.	Leeks, John R.
Cox, Stanley H.	Macdonald, Harry H.
De'ath, Stanley F.	McElroy, Brian P. G.
Deeley, Denis S.	Morling, William
Dent, Royston C.	Packer, Denis C.
Down, Geoffrey L.	Peck, Stewart F.
Eckersall, Leslie	Pottie, Thomas H.
Fearey, Noel R.	Radway, Reginald E.
Fletcher, Alan G.	Saunders, Frank H.
Ford, Frederick E.	Skinner, Frederick H.
Fraser, Jack W.	Smart, Colin B.
Freeman, Geoffrey E.	Stanley, Gordon F.
Fryman, John G.	Tilley, John C.
Gibbs, Kenneth G.	Vale, William T.
Glossop, Peter F. R.	Williams, Francis A.
Gold, Francis G.	Wootton, Joseph S.
Goodman, Peter S.	
Grove, David T.	

ALLIED SOCIETIES

Changes of Officers and Addresses

Devon and Cornwall Architectural Society, Exeter Branch: Chairman (since 7 March 1951), J. Ardern Powell [*F*], Grosvenor Chambers, 32 The Terrace, Torquay. Hon. Secretary and Treasurer, Mr. Victor Uren [*A*], 13 Fairview Terrace, Exmouth.

Plymouth Branch: Chairman, G. E. W. Denning [*L*], Stoke Damerel Manor, Chapel Street, Devonport.

Truro Branch: Chairman, J. V. Salisbury [*F*]. Hon. Secretary, J. H. Crowther [*A*].

South Wales Institute of Architects, Eastern (Newport) Branch: The address of Mr. L. F. Hurley [*A*], Chairman, is now 'Fonthill', Bellfountain Road, Crickhowell, Breconshire.

Oldham Society of Architects: President, G. B. Howcroft, M.C., M.A. [*F*].

Northamptonshire, Bedfordshire and Huntingdonshire Association of Architects, Northamptonshire Branch: Hon. Secretary, Mr. Ivan Morris [*A*], 76 Norton Road, Northampton.

Hampshire and Isle of Wight Architectural Association, Isle of Wight Chapter: The address of Mr. S. H. E. Mansbridge [*L*], Hon. Secretary, is now Bars Hill House, Cowes, I.O.W. (as from 25 March last).

Sheffield, South Yorkshire and District Society of Architects and Surveyors: Dinner-Dance

The fourth successful dinner-dance of this Society was held on 28 February at the Royal Victoria Hotel, Sheffield. It was attended by some 250 members and guests, including the Lord Mayor, Alderman T. W. Bridgland, J.P., and the Lady Mayoress; Mr. Norval Paxton, M.C. [*F*], Vice-President, R.I.B.A., and Past President of the West Yorkshire Society of Architects, and Mrs. Norval Paxton; Mr. G. M. Flather, The Master Cutler, and Mrs. Flather, The Mistress Cutler.

The President, Mr. R. Cawkwell [*F*], proposed the toast of 'The Queen'. The toast of 'The City of Sheffield' was proposed by Mr. J. McDonald Fairweather [*F*], and replied to by the Lord Mayor.

Mr. Fairweather suggested that pride of workmanship had led Sheffield to a place of eminence in the past, and that the maintenance of that position was dependent upon the impact of such pride on present knowledge and resources, backed by a sense of responsibility and by enterprise unhampered by restrictive practices. The Lord Mayor in reply suggested that the re-shaping of Sheffield offered a splendid opportunity for co-operation between the Corporation and the architectural profession.

The toast of 'The Royal Institute of British Architects and Allied Societies' was proposed by the Master Cutler, and was replied to by Mr. Paxton, who hoped that the reign of Queen Elizabeth the Second would inaugurate a second Renaissance age of architecture in this country. Mr. W. G. Davies [*F*], City Architect, proposed the toast of 'The Guests' in which he referred to the strong bonds which existed between the various Allied Societies and the R.I.B.A. The toast was briefly replied to by Mr. H. R. Bramley, Honorary Legal Adviser to the Society.

A very successful floor show by the students of the University Department of Architecture, entitled 'The Passing of the Good Old Days of Architecture', was given during the evening.

Northern Architectural Association: Annual Dinner

The Annual Dinner of the Northern Architectural Association was held in the Royal Station Hotel, Newcastle-upon-Tyne, on 13 March, having been postponed from 7 February owing to the death of his late Majesty.

The R.I.B.A. was represented by Mr. Norval R. Paxton, Vice-President, who responded to the toast of 'The Royal Institute'. Neighbouring Allied Societies were represented by Mr. W. H. Kininmonth [*F*], President of the Edinburgh Architectural Association, and Mr. Colin Rowntree [*F*], President of the York and East Yorkshire Architectural Society.

The Lord Mayor of Newcastle (Alderman W. McKeag) replied to the toast of the 'Municipal

Authorities of our Province', which was proposed by the President, Mr. P. Clive Newcombe [*F*]. Mr. Newcombe's presence, after his long illness, was a source of much pleasure to the company.

Among other guests were Mr. T. V. Deas [*A*], Chairman of the Tees-side Branch, Northern Architectural Association, and Colonel M. D. Methven, General Manager of North Eastern Trading Estates, Ltd., as well as members of other professional associations.

Coventry Society of Architects: Annual Dinner
The annual dinner of the Coventry Society of Architects was held at the Regent Hotel, Leamington, on Friday 14 March.

Mr. S. J. Oldham (*L*), Vice-Chairman of the Society, proposing the toast of 'The City of Coventry', spoke of the unfortunate delay in the rebuilding of the city, and made a plea for making it more attractive residentially. The Deputy Mayor, Alderman B. H. Gardner, referred to the acute difficulties the city experienced in shortage of building labour and to its rapid increase in population, and said that nevertheless the Corporation Housing Committee hoped to make another 2,500 to 3,000 houses available during the next three to five years.

The toast of the R.I.B.A. was proposed by Mr. D. Kaye [*A*], Chairman of the Society, and Mr. F. J. Osborne, M.C. [*F*], Past President of the Birmingham and Five Counties Architectural Association, responded. Mr. F. B. Reyner [*A*] proposed the toast of 'The Guests', and Councillor F. G. Robinson, President of the Coventry and District Association of Building Trade Employers, responded.

The Deputy Mayoress accompanied the Deputy Mayor, and other guests included the Town Clerk of Coventry, Mr. Charles Barratt, Mrs. Barratt, and Mr. D. E. E. Gibson, C.B.E., M.T.P.I. [*A*], City Architect, with Mrs. Gibson.

GENERAL NOTES

Rome Scholarship in Architecture 1952
The Faculty of the British School at Rome announce that out of the seven entrants who sat the en loge competition the following five have been chosen to enter for the final: D. I. Black, D.A. (Edin.) [*A*]; I. C. Gordon, Dipl. Arch. (U.C.L.) [*A*] (Bartlett School of Architecture); A. J. Kaye, B.A. (Arch.) (Lond.) [*A*] (Bartlett School of Architecture); R. R. Meadows, A.M.T.P.I. [*A*] (Hull School of Architecture); H. J. Richards, Dipl. Arch. (U.C.L.) [*A*] (Bartlett School of Architecture).

York Summer School
The Fourth York Summer School for Students will be held this year from 9 to 23 August.

The School is organised by the Academic Development Committee of the York Civic Trust, and is under the direction of Dr. William A. Singleton, Dip.T.P., A.M.T.P.I., A.I.Struct.E. [*A*]. It combines a course in making measured drawings and sketches of buildings in York, with lectures on various aspects of the history of architecture. Drawings and sketches executed at the School may be submitted as Testimonies of Study. In addition to the main syllabus, there will be an all-day coach tour to places of architectural interest.

The fee for the School is five guineas, and accommodation will be arranged at St. John's College at a charge of £4 per week. The number of vacancies is strictly limited, and as applications are already being received those Students interested should write for an application form without delay to the Secretary of the Committee at St. Anthony's Hall, Peaseholme Green, York. Applicants should indicate any special qualifications which they feel should be taken into consideration in allocating places in the School. Closing date for receipt of applications is 30 June.

York Courses on Protection and Repair of Ancient Buildings
The first of a series of courses on the protection and repair of ancient buildings will be held in York from 8 to 20 September next, organised by the Academic Development Committee of the York Civic Trust and directed by Dr. Singleton. This course is intended primarily for practising architects, surveyors, clerks of works, etc., whose work requires specialised knowledge in this field. Practical study will occupy about a third of the time. Visits will be arranged to sites in or near York which are of special interest or where repair and maintenance work is being carried out, and students will have the opportunity to survey a building needing attention.

The fee for this course is five guineas, and accommodation, which has been arranged at St. Mary's Hotel, York, ten guineas. There may also be a charge not exceeding 10*s*. to cover the cost of coach visits to places around York. Application forms may be obtained from the Secretary, Academic Development Committee, at the address given above, and in this case also speedy application is advisable. Closing date for receipt of applications, 30 June.

Course on the Preservation and Restoration of Historical Buildings
A one-year post-graduate course in the preservation and restoration of historical buildings is being held at University College, London, under the direction of Professor H. O. Corfiato, S.A.D.G., F.S.A. [*F*]. As it is intended for qualified architects in practice, lectures and studio work are confined to evenings. The course includes series of lectures by specialists in various aspects of preservation and restoration, visits conducted by the architects concerned to ancient buildings where work is in progress, and lectures and demonstrations by artists and craftsmen. The studio work comprises design and construction problems related to actual buildings. Successful students will be granted the University of London Certificate in the Preservation and Restoration of Historical Buildings.

The first course was held in the 1950-51 academic year, and the second one is now in progress. It is proposed to hold another course commencing October 1952, and intending students should communicate with the Secretary, Bartlett School of Architecture, University College, London.

Birmingham School of Architecture
Mr. T. M. Ashford [*F*] is collecting subscriptions to a presentation fund in recognition of the services of Mr. C. Stanbury Madeley who has just retired from the staff of the Birmingham School of Architecture. Mr. Madeley was a student at the Birmingham School in 1904 and became a lecturer there in 1914. He retired in February after 38 years' service to the School. Mr Ashford would like as many ex-students as possible to know of this fund in case they may wish to send subscriptions. He suggests that the maximum subscription should be 5*s*.

R.I.B.A. Golfing Society
The R.I.B.A. Golfing Society has again an attractive fixture list for the coming season. Present membership is between 40 and 50, and an increase in this would be welcomed. Besides the large number of architect golfers who must live within the London area, the Secretary would be particularly glad to hear from any provincial architects who could raise a team to play a match against the London members, possibly over a week-end either in their neighbourhood or at a suitable course convenient to all. Architects from farther afield would be welcomed at the summer week-end meeting at Deal.

The fixture list is as follows:

Meetings	
Tuesday 13 May	Spring Meeting. Denham Golf Club.
Sat. & Sun. 5 & 6 July	Summer Week-end Meeting at Royal Cinque Ports G.C., Deal, Kent. (Accommodation provisionally booked at the Royal Hotel, Deal, from Friday night until Monday morning.)
Thursday 25 Sept.	Autumn Meeting at Berkshire G.C., Ascot. Annual General Meeting.
Matches	
Tuesday 1 April	The Building Alliance G.S. : Royal Wimbledon G.C.
Thursday 22 May	Institution of Civil Engineers G.S. R.A.C. Woodcote Park, Epsom.
Tuesday 10 June	The London Master Builders' Association G.S. at West Hill G.C., Brookwood, Surrey.
Wednesday 16 July	The Royal Institution of Chartered Surveyors G.S. at New Zealand, West Byfleet, Surrey.

Officers for 1952 are as follows:
President, Sir Giles Gilbert Scott, O.M., R.A., Past President, R.I.B.A. *Captain*, A. H. Watkins [*L*]. *Committee:* W. R. F. Fisher [*F*], H. St. John Harrison [*F*], A. E. Henson [*F*], F. T. Smith [*L*], F. Sutcliffe [*F*]. *Hon. Treasurer*, G. Felix Wilson [*L*], 4, Russell Gardens, Kensington, W.14. *Hon. Secretary*, Eric H. Firmin [*A*], 10, Manchester Sq., W.1.

The annual subscription is 10*s*.

R.I.B.A. Cricket Club
The R.I.B.A. Cricket Club held its Annual Dinner at the Marquis of Granby, Cambridge Circus, on 6 March. There were twenty-seven members present, and guests, among whom were Mr. E. L. Bird, M.B.E., M.C. [*A*], representing the R.I.B.A., and Mr. H. J. W. Alexander and Mr. G. Wiltshire, Secretary and Assistant Secretary of the Architectural Association.

The Captain of the Club, Mr. D. S. Taylor [*A*], mentioned that the membership of the Club is now 42, and new members are always welcomed.

The following fixtures have been arranged for the coming season:

Wed. 21 May	London Master Builders' Association (Pearl Assurance Cricket Ground, New Malden).
Thurs. 12 June	The Vitruvians (A.A. Ground).
Sunday 22 June	Blue Circle C.C. (Snaresbrook).
Wed. 25 June	A.A. (A.A. Ground).
Thurs. 17 July	Club Cricket Conference (Guildford).
Wed. 6 August	R.I.C.S. (College of Estate Management Ground, Hinchley Wood).

The following members were elected to the Committee for the year 1952-53: R. R. Fairbairn, M.C. [*A*], C. A. R. Norton [*A*], D. S. Taylor [*A*], B. S. Smyth [*A*], F. G. Cooper [*A*].

Applications for membership should be addressed to the Hon. Secretary, R.I.B.A. Cricket Club, B. S. Smyth [*A*], "Staunton," The Drive, Chorley Wood, Herts. (Rickmansworth 2578 and London Wall 2917-8-9).

Obituaries

Arthur Hamilton Moberly [*F*] died on 1 March, at the age of 67.

Mr. Moberly was a Past Vice-President and member of the Council and Executive Committee and a past Chairman, Vice-Chairman and Hon. Secretary of the Board of Architectural Education, Chairman of the Examinations Committee and of the Visiting Board. He was also a past Chairman, Vice-Chairman and Hon. Secretary of the Literature Standing Committee, and had served on the following Boards and Committees: Board of Moderators, Schools, Sessional Papers, Registration, Emergency Panel, Presidents' War Emergency, Committee to deal with Architect Refugees, Licentiateship, Co-ordination, Reconstruction (as Secretary), Committee for the Teaching of Architectural Appreciation in Schools, Public Relations, Lectures Sub-Committee, Foreign Relations and Committee for the Provision of Professional Text and Reference Books.

He was the representative of the Royal Institute on the Building Apprenticeship and Training Council, and on the Consultative Committee for the Stone Industry, and had previously served on the University of London Architectural Education Committee, the Leverhulme Scholarships Committee of the Architectural Association, the Hammersmith School of Arts and Crafts Advisory Sub-Committee, the Architectural Use of Building Materials Committee of the Ministry of Works, and on the Architects' Registration Council of the United Kingdom.

Mr. J. Alan Slater [*F*], lately Mr. Moberly's partner and his life-long friend, writes:

'The sudden death of Arthur Moberly will be a lasting sorrow to his many friends.

'He came of a distinguished family of English Churchmen. Both his grandfathers, on his father's and his mother's side, were Bishops of Salisbury. According to the family tradition, he was educated at Winchester College, and went up to King's College, Cambridge, in 1903, where he took his degree in Engineering and studied under Professor Inglis. He attended the A.A. Day School—then at Tufton Street—from 1906 to 1908, and it was there that I had the good fortune to meet him. Our close friendship was to last for over 45 years.

'His contemporaries will, I think, agree that he was the most distinguished student of his year, not on account of any brilliance of draughtsmanship, but owing to his sound knowledge of construction and his sensitive appreciation of the essentials of fine architecture.

'He was articled to E. J. May, and attended the Royal Academy Schools from 1908 to 1910, when he became an Associate of the R.I.B.A. It was in the same year that he started on the adventure of private practice, and set up an office in Bedford Row, where, during the next four years, he designed several private houses of charm and distinction.

'Then came the first world war. As he was a keen Territorial he was soon in command of a company of the East Surrey Rifles, and was in France early in 1915. His war experiences and their aftermath are worth recording as they throw light upon his character. At the battle of Festubert, he found himself—to his surprise—leading his company to the attack with no weapon in his hand other than a walking stick. It seems clear that he was willing to give his life if necessary, but that his deepest subconscious instinct revolted at the thought of taking the lives of others. He was seriously wounded in the attack, when a machine gun bullet destroyed the nerves controlling the use of his right hand. This permanent disability, however, did not affect his indomitable spirit. If fate decreed that he should be deprived of the use of his right hand, he still had his left—and such a physical loss was not to disturb his tranquillity nor hamper his professional career. And, indeed, it did not do so. After the war he resumed his practice, and the design of more houses in Cambridge and elsewhere kept him happy and busy.

'By that time both he and I were married, and we were fortunate enough to become near neighbours as well as friends. In 1923 I approached him with a suggestion that we should join forces in practice, and to my delight he accepted my invitation, and our partnership continued until his death. During the years between the two wars we worked together in Berners Street, and it was largely as a result of his ability that large stores for Messrs. Bourne and Hollingsworth Ltd. in Oxford Street and for Messrs. John Lewis and Co. in Cavendish Square were successfully built. We were both also associated with the late C. H. Reilly and William Crabtree in the rebuilding of Messrs. Peter Jones in Sloane Square. Two important buildings for the design of which Moberly was personally and individually responsible were St. Katharine's College near Liverpool—a large Church training college—and a new block in Queen Square, Holborn, for the National Hospital for Nervous Diseases.

'During the war, when all normal practice ceased, he joined the Ministry of Works and helped to organise and edit many publications, such as the Housing Manual and the Post-War Building Studies.

'In 1948 he left London for the country, where he was able to pursue the exacting hobby of cultivating a beautiful garden in the Weald of Kent. This was an ever-increasing joy to him, as his interests were always very closely associated with the land. This change did not prevent him from carrying on our practice in Gower Street, where we had now been joined by R. H. Uren and Charles Pike, and at the time of his death he was also doing useful work on various committees.

'During the whole of his life Moberly devoted much of his time to social welfare. He worked for many years with enthusiasm for the Magdalene College Club in South London, where he was Chairman of the Cambridge House Joint Clubs Committees. He also held the office of Chairman of the Hammersmith School of Building.

'It was possibly owing to his early training as an engineer that he was sympathetic to what may be called the scientific approach to architectural design, though this did not mean that he was any less influenced by the "architecture of humanism".'

'Arthur Moberly was a man who made many friends and no enemies. This was largely due to those qualities of character which were immediately recognised by all who knew him. He was modest, completely unselfish, tolerant in his judgments, wise in counsel, and always ready to help those who came to him for advice or assistance. He will, indeed, be greatly missed.'

Hugh Roger Greville Montgomery [*Hon. A*] died on 13 February at Funchal, Madeira, where he was on holiday.

From 1920 Mr. Hugh Montgomery was associated with his father, the late H. Greville Montgomery (who died last December) and his late uncle in conducting the Building Exhibition at Olympia. His sudden death at the age of 61 came as a great shock to his many friends in the architectural profession and building industry. The fact that the three exhibitions for which he had been most responsible (in co-operation with his wife, Mrs. Molly Montgomery) had exceeded previous records and been outstanding successes was sufficient evidence of his ability. But he possessed much more than good powers of organisation; all those with whom he came into contact were impressed by his kindliness and charm of manner, so that even the most ordinary business proceedings were, with him, invariably conducted in an atmosphere of friendliness and goodwill. It was therefore not surprising that he followed the tradition of his father in being not only a most generous donor to the funds of the Architects' Benevolent Society but in taking an active interest and share in its benefactions. That the Society made him a Vice-President was a consequence of this genuine interest and not a reflection of the size of his donations, large though they were.

He was educated at Repton and at Clare College, Cambridge. Enlisting in the Royal Norfolk Regiment in 1914, he received a commission, was awarded the M.C. for gallantry, and was invalided out as a result of wounds, with the rank of lieutenant-colonel. He leaves a widow, a son and daughter. The son, Mr. Bryan Montgomery, is to be associated with Mrs. Molly Montgomery in the organisation of the 1953 Building Exhibition, which will be the 25th in the series started by the brothers Montgomery.

Mr. Martin Buckmaster, F.S.A., adds the following personal appreciation:

'The sad death of Hugh Montgomery [*Hon. A*] removes an energetic worker in the architectural world. Although not a practising architect his interests were wide and helpful in furthering the profession in a technical direction. For the last few years he organised the Building Exhibition at Olympia, after his father's retirement, and there is little doubt he overworked himself in making the 1951 Exhibition such a success. His generous contributions to the A.G.B.I. should not be forgotten and he will be much missed by his colleagues and friends.

'It is pleasant to know that the Building Exhibition will continue as usual under the management of his capable wife and staff.'

William Campbell Jones [*Retd. F*] died on 2 November 1951, aged 89.

Mr. Campbell Jones, who was born in Mexico, was educated at Haileybury and at the Architectural Association and Royal Academy schools, and articled to the late Mr. E. H. Burnell. He was Donaldson Medallist 1881-82.

Mr. R. N. Wakelin [*A*], a partner in the firm of Campbell Jones and Sons, writes of him as follows:

'William Campbell Jones will be particularly remembered in connection with his work in the City of London, where he practised from 1887 until his retirement in 1945. During this time he was responsible for some fifty branches in London and the Home Counties for the Westminster Bank; alterations to the Head Office of Messrs. Barclays Bank in Lombard Street, together with numerous branches; and a number of other bank premises in the City. The head office of Lloyds Bank in Lombard Street, which he built in conjunction with Sir John Burnet and Partners, was awarded the London Architecture Bronze Medal in 1932.

'Mr. Campbell Jones was also responsible for additions and extensions to the Sun Insurance Office in Cornhill, which was originally designed by Cockerell. He also designed a number of private houses, and in addition to his work in a busy architectural practice was Surveyor to the Worshipful Company of Skinners for fifty years, 1891-1941. During that

time he designed the new chapel and sanatorium at Tonbridge School and made many additions and alterations to the Company's schools. He was also Surveyor to the City Parochial Foundation from 1913-37.

'As one who has had the privilege of being associated with his firm for 20 years, I find it difficult to avoid making a catalogue of all the work carried out in a practice extending over nearly 60 years—in which time its extent and variety was indeed striking—and to forget the force of character which made this possible. Very much the head of his firm, Campbell Jones was well posted in all the current aspects of the many and various buildings which he carried out, and, with a meticulous eye for errors and detail, his close scrutiny was applied to all drawings and correspondence passed out from the office.

'It is as a personality that many will remember him, and his passing severs yet another of the few remaining links between the past and present generation of architects.'

Thomas Charles Hardy [*A*] died on 3 May 1951 at the age of 61.

Mr. Hardy studied at the Royal Technical College and Art School, Glasgow, and then was articled to Mr. James Miller. After serving in the first world war Mr. Hardy became an Associate of the Institute in 1920, then went to the U.S.A. for a time. In 1925 he returned, and was for some time as assistant with a Glasgow firm, then in 1934 entered into partnership (R. J. Walker, Hardy and Smith [*A*/*A*]) which lasted until the second world war. During that war Mr. Hardy served as a Claims Officer for the War Office.

In Scotland Mr. Hardy is known to have been associated with an addition to the Samaritan Hospital, Glasgow, and with St. Gerard's Hospital, Govan; in the U.S.A. with the Realty and the Wick buildings, Ohio.

Philip Appleby Robson [*F*] died 14 November 1951, aged 80.

Mr. Robson was articled in about 1890, and started in personal practice about 1898. He practised mostly in Westminster, with a break in Manchester from 1919-22. He retired in 1939. His principal known architectural works are St. Andrew's Church, Catford, and St. Gabriel's College, Camberwell, both in south-east London, and the Technical Institute, Eastbourne.

Mr. Robson was the author of *Architecture as a Career for Women*, besides two books on hockey and a volume of verse.

John Eric Osborne, A.M.T.P.I. [*L*], died 31 October 1951, aged 49.

Mr. Osborne was articled to the Borough of Heston and Isleworth and was subsequently an assistant with the County Borough of Newport, Mon., with the Boroughs of Richmond and Ealing, with the Public Works Department, Tanganyika Territory, with the Metropolitan Borough of Shoreditch (where he was appointed Senior Architectural and Reconstruction Assistant in 1936) and with the Hungerford Rural District Council. In Shoreditch Mr. Osborne was responsible for the Town Hall extension.

In 1951 he entered into partnership with Mr. Patrick B. Sweetnam [*A*], who is carrying on the practice at 107 High Street, Hungerford, Berks.

Samuel Dennis Walley Timmins [*L*] died 17 October 1951, aged 51 years.

Mr. Timmins served his articles with Messrs. Peacock and Bewlay, Birmingham. He was with the firm of Watney Combe Reid and Co. Ltd. 1927-30, with Holborn Borough Council 1930-31, and in private practice in Wolverhampton 1934-50.

Mr. Timmins was assistant architect for the building of Kelham Theological College and was himself responsible for two blocks of flats at Wolverhampton and for public baths for Holborn Borough Council. He became a Licentiate of the R.I.B.A. in 1932.

Francis William Deas [*Retd. F*], of Edinburgh, died on 13 November 1951 in his 80th year.

Although well known in Edinburgh as an architect, Mr. Deas began his apprenticeship later in life than is usual. After five years in Sir Rowand Anderson's office and two spent in measuring and drawing notable examples of houses and churches, he started his own practice, which continued steadily through his working life except during the First World War. His commissions were almost exclusively in the country and ranged from mansion to cottage and from the north of Scotland to the south of England. A few examples are Newbrough Hall, Hexham, Northumberland; Kinfauns Castle, Perthshire; repair and layout of Balmerina Abbey, Fife; Hindley Hall and Hindley House, Stocksfield, Northumberland; the Elgin Arms Hotel, Limekilns, Fife; cottages on the Knightshayes Estate, Tiverton, Devon; a gamekeeper's house at Dava, Inverness-shire. He built in none of the conventional modes and claimed only to build in 'the commonsense style'.

He claimed descent from the Mylnes, for many centuries Master-Masons to the Kings of Scotland, and from the Rennies.

Mr. Deas's T'ang pottery and certain other objects of interest go to the Royal Scottish Museum and other public institutions.

Bertram de Helsby [*L*] died on 27 July last, aged 58.

After serving his articles in Stockport, Mr. de Helsby practised at various times in Manchester and district, in North Wales, Shropshire and London. He was responsible for housing schemes in Llandudno and Donnington, Shropshire, for several large blocks of flats in and around London, including those on Richmond Hill, Gloucester Court, Kensington, and Fairacres, Roehampton, and for private houses (his chief interest) in Wimbledon, Putney, and at Ham Common. Mr. de Helsby was also a keen painter, and painted a number of pictures in Cornwall, Shropshire, Wales and Cheshire. Furniture making, in which he was a real craftsman, was another hobby.

The war put an end to Mr. de Helsby's private practice, and he joined the Ministry of Works and later transferred to the War Damage Commission. He hoped subsequently to resume his practice, but ill-health unhappily intervened.

Arthur Blomfield Jackson [*Retd. F*] died on 19 August 1951 at the age of 79.

Mr. Jackson was the son of the Reverend Prebendary Blomfield Jackson. He was educated at Marlborough College, and articled to Mr. Reginald Blomfield. He subsequently practised in London, first with two successive partners, then alone. For the last few years before his retirement in 1948 he conducted his practice from his home in Well Walk, Hampstead.

Mr. Jackson was appointed a Surveyor in the Diocese of St. Albans in 1895. When in 1914 that Diocese was divided into St. Albans and Chelmsford he became a Surveyor in the Chelmsford Diocese until 1945. From 1903 to 1938 he was Surveyor in the Diocese of London. From 1934 to 1944 he was Surveyor in the Diocese of Southwark. In these capacities he was responsible for the design of several new vicarages and for repairs, restorations, improvements and redecoration of a number of churches. For many years Mr. Jackson was President of the Ecclesiastical Surveyors Association.

In addition to his church work Mr. Jackson carried out various works of reconstruction and redecoration to a number of London theatres, including His Majesty's, Savoy, Garrick, St. James's, Lyric, Shaftesbury, Strand and Comedy—several of these to the designs of his late partner, Mr. C. J. Phipps.

Mr. Jackson also carried out a number of alterations and additions to various country houses, besides designing the new science rooms, laboratories and racquet court in Great College Street for Westminster School, the re-building of No. 25 Conduit Street, the women's hall at Billingshurst, the office building in College Street, Dublin, for the Star Life Assurance Society, and the extension of their London head office in Moorgate Street.

James Ward [*L*] died on 1 September, aged 65, in Kenya, where he had lived for many years.

Mr. Ward joined the Royal Engineers at the age of 18, was sent overseas immediately on the outbreak of the First World War, fought in the first engagement at Mons, and served throughout the war. After the war he was drafted to Egypt on ordnance work and later came back to England and was put in charge of the Drawing Office at Shoeburyness. At the end of his 21 years' service he left the army with the rank of Regimental Sergeant Major.

Mr. Ward then went to Kenya, was for 12 years Chief Architect to the Uganda State Railway and then set up a private practice. He died as the result of a fall.

John Bernard Mendham [*A*] died on 22 June at the age of 62.

Mr. Mendham was articled to a civil engineering firm in Birmingham, and also attended the city Technical Schools. After some years first with the County Surveyor of Warwickshire and then with the Hereford County Council, he became Surveyor and Architect to the Bournville Model Village Trust, planning and setting out their new model village. During the First World War Mr. Mendham was attached to the Air Ministry, and built a number of aerodromes for them. He was subsequently Superintending Architect to the Ministry of Agriculture for Wales and the East Midland Counties, and from 1922 to 1939 he was in private practice in London.

Mr. Mendham was known for a scheme for new Waterloo and Charing Cross bridges, which was considered by the L.C.C. Among architectural works carried out by him are various churches, including the Roman Catholic church at Rye, Sussex, St. Paul's Hospital, London, two Pickett-Thomson research laboratories and the layout of a new seaside resort at Aubergue, near Calais. His design for the extension of St. Andrew's Cathedral, Sydney, was hung in the Royal Academy in 1938.

Joseph William Hammond [*L*] died on 17 September 1951 at the age of 74.

Mr. Hammond was engaged in general practice, a large proportion of which consisted in alterations to and the rebuilding of licensed premises.

Mr. Hammond had a great interest in sport, particularly in bowls, and was for many years Hon. Secretary of the Essex Bowling Association and President of the English Bowling Association. He was also in his earlier years a keen cricketer, a footballer and qualified referee, a successful long distance runner and a keen breeder and judge of Irish terriers.

His son, Mr. J. E. Hammond [*L*] and his other partner, Mr. F. A. E. Arnett [*L*] will carry on the Romford practice under its present title of J. W. Hammond.

Mr. **O. A. Yuncken** [*F*], Hon. Treasurer and Past President of the Royal Australian Institute of Architects, died on 18 May last, aged 48.

He was born at Richmond, Victoria, and educated at Melbourne Church of England Grammar School. He was articled for four years to a Melbourne firm, studied architecture at Melbourne University and received his Diploma in 1926.

On completion of his studies Mr. Yuncken travelled abroad, particularly studying hospital design in Europe and America. In 1933 he started in private practice, founding the firm of Yuncken, Freeman and Freeman. At the time of his death the firm was practising as Yuncken, Freeman Brothers, Griffiths and Simpson. The practice has embraced many fields but with particular emphasis on the architecture of hospitals and, in recent times, the design of imported mass housing for Victorian Government Authorities. In addition to his practice Mr. Yuncken, until a few months before his death, lectured in Professional Practice at Melbourne University School of Architecture. During the war Mr. Yuncken was a consulting architect to the United States Army, rising to the position of Chief of Design for the U.S.A. Services of Supply in the south-west Pacific. He played a prominent part in introducing and developing the vital prefabricated hospital scheme for Pacific battle areas.

Mr. Yuncken was President of the Royal Australian Institute of Architects from 1939 to 1940.

Notes from the Minutes of the Council

MEETING HELD 4 MARCH 1952

H.M. King George VI: The following telegram, in response to the Institute's message of condolence, was received: 'Graham Henderson, President Royal Institute of British Architects. Her Majesty has deeply appreciated your telegram of sympathy. Private Secretary.'

The Council received with appreciation a number of telegrams of sympathy on the death of His Majesty, Patron of the Royal Institute, from overseas architectural Societies and Honorary Corresponding Members.

Loyal Address to H.M. The Queen: The Council gave authority for the inscription and presentation to Her Majesty The Queen of the loyal address, the text of which appeared on p. 155 of the March JOURNAL.

Appointments

R.I.B.A. Representatives on B.S.I. Committees: (i) *PLC 9: Polythene Tubing:* Mr. H. E. D. Adamson [*A*], in place of Mr. R. Cotterell Butler [*A*], appointed by the Council at their meeting on 8 January, but unable to accept. (ii) *STB/6: Exfoliated Vermiculite:* Mr. George Fairweather [*F*]. (iii) *Drafting Panel for Glossary of Terms used for Natural Stone:* Mr. Michael Farey [*A*] and Mr. J. C. Eastwick-Field [*A*].

Ministry of Housing and Local Government Housing Medals 1952: In response to the invitation of the Minister, the following were nominated for appointment as Chairmen of Regional Awards Committees: *Region No. 1: Northern*, Mr. T. J. Cahill [*F*]. *Region No. 2: E. and W. Ridings*, Mr. R. A. H. Livett [*A*]. *Region No. 3: N. Midland*, Mr. T. N. Cartwright [*F*]. *Region No. 4: Eastern*, Mr. Peter B. Dunham [*F*]. *Region No. 5: London*, Mr. A. W. Kenyon [*F*]. *Region No. 6: Southern*, Mr. A. E. Geens [*F*]. *Region No. 7: South Western*, Lieut.-Col. Eric Cole [*F*]. *Region No. 8: Wales*, Mr. T. Alwyn Lloyd [*F*]. *Region No. 9: Midland*, Mr. D. E. E. Gibson [*A*]. *Region No. 10: North Western*, Mr. W. Cecil Young [*F*]. *Region No. 11: South Eastern*, Mr. C. E. Culpin [*F*].

In addition, the following were nominated as architect members of the London Regional Awards Committee: Mr. Edward Armstrong [*F*], Mr. J. F. Howes [*F*] and Mr. C. H. James [*F*].

The Honorary Corresponding Membership: The Council invited the following to accept nomination for election as Honorary Corresponding Members: M. John Antoniades (Greece); Don Jose-Maria Muguruza and Señor Secundino Zuazo (Spain).

John Francis Bentley: The Council gave authority for an inscription to be carved on the wall adjoining the panel of names of Royal Gold Medallists recording the fact that John Francis Bentley was recommended as Royal Gold Medallist in 1902, but died before the recommendation could receive the assent of the general body of members and be submitted to the King. Enquiries were made from the royal household at the time, but the decision was given that the medal could not be awarded posthumously, and it was then awarded to Thomas Edward Collcutt instead. The Council considered that the 50th anniversary of John Francis Bentley's death provided a suitable opportunity of making a permanent record of these facts.

Proposed Exhibition of Brazilian Architecture: At their meeting on 9 October 1951 the Council approved a recommendation of the Public Relations Committee that an exhibition of Brazilian architecture should be held at the Institute. It has not proved possible to complete arrangements for this exhibition and it will not now be held.

Bequest to the Institute: the late Miss Rose Shipman: The Council were informed that under the will of the late Miss Rose Shipman, a bequest is made to the Institute to found a travelling studentship to be called the Rose Shipman Studentship, for such purposes as the Institute may decide. The estate consists of a house with furniture, fittings, etc., some of which have been bequeathed specifically to the Victoria and Albert Museum.

Regulations for Architectural Competitions: The Council approved a number of amendments to the Regulations governing the Promotion and Conduct of Architectural Competitions and to the Model Form of Conditions. These amendments were principally in regard to matters of drafting and were designed to qualify the meaning of the word 'architect' where used in the Regulations and Model Form of Conditions. The Regulations and Model Form are being reprinted incorporating the amendments approved.

Fees for Assessors in Architectural Competitions: The Council approved an amendment to the R.I.B.A. Scale of Charges for assessing competitions in connection with higher cost projects. The scale charge is twenty-five guineas plus one-fifth of 1 per cent upon the estimated cost of the proposed building. This scale remains in force for schemes costing up to £1,000,000, but is reduced to one-tenth of 1 per cent on any amount in excess of £1,000,000.

Membership: The following members were elected: as Honorary Associate, 1; as Fellow, 1; as Associates, 25.

Students: 95 Probationers were elected as Students.

Applications for Election: Applications for election were approved as follows: *Election 6 May* 1952: as Fellows, 6; as Associates, 80. *Election 17 June* 1952 (*Overseas Candidates*): as Associates, 4.

Application for Reinstatement: The following application was approved: as Associate, Mrs. Elizabeth Mary Bertram.

Resignations: The following resignations were accepted with regret: Mrs. Bertha Mary Blessley [*A*], Mrs. Phyllis Kathleen Moore [*A*].

Applications for Transfer to Retired Members' Class under Bye-law 15: The following applications were approved: *As Retired Fellows:* Quentin Mangnall Bluhm, James Morris, Joseph Seddon.

Obituary: The Secretary reported with regret the death of the following members: Hugh Roger Greville Montgomery, M.C. [*Hon. A*], Robert Thom. Currie [*F*], Arthur Hamilton Moberly [*F*], William Arthur Ross [*F*], Stewart Kaye [*A*], William Lynn Thompson [*A*], Norman Evans [*L*], Charles Evans Thomas-Medhurst [*L*], Percy William Upton [*L*], William Leicester [*Retd. L*].

By a resolution of the Council the sympathy and condolences of the Royal Institute have been conveyed to their relatives.

Membership Lists

ELECTION: 1 APRIL 1952

The following candidates for membership were elected on 1 April 1952:

AS FELLOWS (7)

Crockett: Geoffrey Albert, B.A. (Arch.) (Lond.), A.M.T.P.I. [*A* 1935].
Firmin: Eric Henry [*A* 1934].
Lacoste: Gerald Auguste Charles, M.B.E. [*A* 1930].
Nilgiria: Jamshed Cowasjee [*A* 1947], Colombo, Ceylon.
Parker: Robert Geoffrey [1936], Melbourne, Victoria, Australia.
Ross: David John Alexander, Dip.Arch. (Abdn.) [*A* 1922], Aberdeen.
Scott: Wilfrid John, Dip.Arch. (Dunelm) [*A* 1934], Castle Eden, Co. Durham.

AS ASSOCIATES (44)

Abbott: Anthony Cecil, M.C., A.A. Dipl.
Ashton: John Roy Stuart, B.Arch. (Sydney).
Atkinson: James Duncan, B.Arch. (C.T.), Kenilworth, Cape, S. Africa.
Balm: Raymond Hugh, B.A. (Arch.) (Lond.).
Belton: Sheila (Miss), Dip.Arch. (The Polytechnic), Thorpe Bay.
Best: David Samuel, Dip.Arch. (Manchester), Liverpool.
Boucher: Paul William, Cheam.
Byng: Robert.
Donkin: Arthur Barry, Dip.Arch. (Nottm.), Rainworth.
Gawler: David Phillip, B.Arch. (Melbourne), Ringwood, Victoria, Australia.
Harvey: Alexander Purves, D.A. (Edin.), Edinburgh.
Havyatt: Valerie (Mrs.), B.Arch. (Sydney).
Hayward: John Hansell, M.A. (Cantab.).
Henderson: Arthur Smythe, Rotherham.

Hope: Arthur Haywood, M.A. (Cantab.), Bolton.
Jack: Robert William Morrison, Dip.Arch. (Abdn.), Perth, Scotland.
Keen: Stanley, Chingford.
King: George James.
Knapp-Fisher: Michael Bryan, Sevenoaks.
Lennard: McDonald Douglas, B.Arch. (Rand), Johannesburg, S. Africa.
Levy: Anthony Bernard.
Mansfield: Edward John Dunn, Ilford.
Matthew: Bernard Laurie, D.A. (Edin.), Edinburgh.
Meier: Phillip Hilton, B.A. (Arch.) (C.T.), Cape Town, S. Africa.
Norton: Maurice Cecil Edwin, B.Arch. (C.T.).
Pettit: Robert Eric, B.Arch. (Rand), Durban, S. Africa.

Rowe: Thomas Ronald Michael, D.A. (Edin.), Edinburgh.

St. Leger: Julian Sabbe.
Shepherd: Gerald Arthur Anthony, A.A. Dipl., Worthing.
Smith: Stanley Frederick.
Swain: Alan Hughes, Hove.

Thomas: Richard, B.A. (Cantab.), A.A. Dipl., Tunbridge Wells.
Thomas: Robin Patrick, D.F.C., Portsmouth.
Thompson: Neil Henry, B.A. (Cantab.).
Toomey: James Leon, Sydney, Australia.
Tucker: Leonard John, Dip.Arch. (Manchester), Manchester.

Veall: Frederick, Hornsea.
Vinter: Tom, Stockton-on-Tees.

Watson: John Ramsay, Dipl.Arch. (Oxford), Nairobi, Kenya, East Africa.
Watson: Leonard Henry.
Wightman: Harold Alan.
Wilson: Edward John, Dartford.
Woolman: Errol Oswald, D.A. (Edin.), Edinburgh.
Yates: David Charles, Cheltenham.

AS LICENTIATES (7)

Barter: Alan Stuart.
Coates: Walter Siddall, Scunthorpe.
Furse: Hubert Edwin.
Gunning: Stanley Clifford, Chelmsford.
Scott: John William.
Thomas: Herbert, Manchester.
Webber: John Leslie, Cardiff.

Members' Column

This column is reserved for notices of changes of address, partnership and partnerships vacant or wanted, practices for sale or wanted, office accommodation, and personal notices other than of posts wanted as salaried assistants for which the Institute's Employment Register is maintained.

APPOINTMENTS

Mr. G. Raphael Bonella [*A*] has been appointed Staff Architect to Messrs. W. J. Simms, Sons and Cooke, Ltd., of Haydn Road, Sherwood, Nottingham, and he will be pleased to receive trade catalogues, etc.

Mr. J. V. Gandhe [*A*] is working as an architect to Eastern Command H.Q., Ranchi. He will be pleased to receive trade catalogues, information sheets, etc. His address is c/o Chief Engineer, Eastern Command H.Q., Ranchi (Bihar), India.

Mr. James Ramsay [*A*] has taken up an appointment with the Architect's Branch, Cape Provincial Administration, Wale Street, Cape Town, South Africa, and all communications should be sent care of that address.

PRACTICES AND PARTNERSHIPS

Mr. R. Vyvyan Board, B.Arch. [*A*], has opened an office at 17 Portland Square, Plymouth, in association with **Mr. D. H. Leonard-Williams,** A.A.Dipl. [*A*], who also has an office at 50 Exeter Street, Tavistock. Trade catalogues, etc. would be appreciated.

Mr. R. Willis Deans, G.M. [*A*], and **Mr. Alick G. Inglis** [*A*], practising at Kampala, Jinja and Mbale, under the style of **Deans and Inglis,** announce that they have taken into partnership **Mr. Frederick A. Wilkinson,** Dip.Arch. [*A*], and **Mr. William McGuinness,** Dip.Arch. [*A*]. The practice will continue from the same addresses, under the new style of **Deans, Inglis and Partners.**

Mr. Maurice Hanna [*A*] is now in practice at 93 Church Road, Upper Norwood, S.E.19 (LIVingstone 2049), where he will be pleased to receive trade catalogues, etc.

Messrs. James and Bywaters (Mr. C. H. James, R.A. [*F*], and **Mr. S. F. Bywaters)** have taken into partnership two of their assistants, **Mr. B. J. Saunders** [*A*] and **Mr. D. Le M. Brock,** B.Arch. [*A*]. The name of the firm remains unchanged.

Mr. Alan Mather [*A*] has started private practice at 23a Northumberland Road, Sheffield, and will be pleased to receive trade catalogues, etc.

Messrs. Brian L. Sutcliffe and Partners [*F*/*F*] will close their office at Quarry Hill House, Quarry Street, Guildford, as from 1 April 1952.

Mr. F. T. Orman [*F*] will retire from the partnership on 31 March, but will practice in his own name at the Guildford address as from 1 April. **Messrs. Brian L. Sutcliffe and Partners** will continue to practise from their other offices, and any communications should be sent to their Head Office at 5 Manchester Square, London, W.1.

Messrs. Whinney, Son and Austen Hall [*F*/*F*] and **Mr. W. F. Howard** [*F*] have now dissolved their partnership.

Mr. Geoffrey G. Williams [*A*] has now taken over the practice formerly carried on by **Mr. H. Greenhalgh,** F.R.I.C.S. [*L*], the firm now being styled as **Greenhalgh and Williams,** at 15 Mawdsley Street, Bolton.

CHANGES OF ADDRESS

Messrs. Ardin and Robbins [*A*/*A*] have removed to 129 Mount Street, Berkeley Square, London, W.1.

Mr. A. Falconer Fry [*A*] has moved his office and residence to 'Brown Gables', The Avenue, Charlton Kings, Glos. (Cheltenham 53437), from which address he will continue his practice.

Mr. Herbert J. Orchard [*A*] has changed his address to Derby House, Derby Road, Haslemere, Surrey.

The address of **Mr. D. H. S. Prince** [*A*] is now 58 Tio Tio Road, Wellington, E.5, New Zealand.

Mr. Allan D. Reid [*F*] has moved his London office from 30 John Street, W.C.1, to 55 Queen Anne Street, Cavendish Square, W.1.

PRACTICES AND PARTNERSHIPS WANTED AND AVAILABLE

Fellow at present holding important post in municipal office seeks partnership or position leading thereto in north-east England. Well known in five northern counties. Also qualified town planner, A.M.T.P.I. First-class experience and considerable executive and administrative experience. Would also consider south of England if prospects are good. Box 21, c/o Secretary, R.I.B.A.

Fellow in charming south midland city contemplating retirement would sell goodwill and equipment reasonably. Box 26, c/o Secretary, R.I.B.A.

Fellow with wide experience in U.S.A., Canada, Australia and India seeks partnership or position leading thereto. Housing schemes, hospitals, schools, commercial and public buildings, town planning. Willing to work abroad. Box 29, c/o Secretary, R.I.B.A.

Associate with experience of surveying and all branches of architectural practice and procedure, having held positions of responsibility, seeks partnership in London or surrounding district. Small number of clients and substantial capital available. Box 31, c/o Secretary, R.I.B.A.

FOR SALE

For Sale. 8 Vols. *The Modern Carpenter and Joiner* (Gresham Publishing Co. 1906), G. Lester Sutcliffe, Editor. As new. Also vols. 108/9 THE ARCHITECTURAL RECORD (Jan. to Dec. 1951), each issue separate. Excellent condition. Details and offer to Box 27, c/o Secretary, R.I.B.A.

For Sale. 10 in. dumpy level by Cooke, Troughton and Simms, 3 screw base, complete with mahogany and leather cases and wooden tripod; recently overhauled by Stanleys. £15. Box 30, c/o Secretary, R.I.B.A.

ACCOMMODATION

Three rooms to let for professional use in Bloomsbury Square area. Total area approximately 640 sq. ft. Rental £350 per annum, inclusive of rates, central heating and cleaning. Box 28, c/o Secretary, R.I.B.A.

MISCELLANEOUS

The City Architect and Planning Officer of Coventry would welcome information on building materials and products, and especially new ideas, to be used in conjunction with the large building programme now being undertaken and for the Departmental Library. Firms should send information and samples to **Mr. Donald Gibson,** C.B.E. [*A*], in the first instance; interviews will be arranged in suitable cases by appointment.

Correction

It is regretted that in the March Members' Column, under the section 'Changes of Address,' the name of Mr. Gerard Goalen [*A*] was given as Coalen. Mr. Goalen's address is now Mulberry Green House, Harlow, Essex.

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